ELECTRICAL REVIEW

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Load-Curve Levelling

Peak Control of Non-Industrial Demand

THE appointment by the Minister of Fuel and Power of a committee, as reported by us last week, for investigating the possibility of controlling the non-industrial maximum demand is a step in the right direction. Ways and means to this end have been discussed in our columns on a number of occasions recently and provided the theme of our leading article of 27th February. The latter related more specifically to ripple control, which was the subject of an I.E.E. paper last month by Messrs. T. W. Ross and R. M. A. Smith. Many other methods are, however, available for consideration by the committee, which will have Sir Andrew Clow as its chairman and will include engineers with long experience of the various relevant aspects.

Preparing for Next Winter

Since the object in the first instance is to provide for conditions that are likely to obtain next winter, when a repetition of the present mild weather is statistically improbable, shift will have to be made in emergency with whatever systems of peak control can most expeditiously be brought into use, having regard to other calls on manufacturing capacity and man-power. The committee will, no doubt, also pay attention to longer-term aspects, since the cuts in the original generating plant programme of the Central Electricity Board make it practically certain that the need for the most efficient use of resources will remain of particular force for several years. Implicit in this is the necessity to raise load factor. There is nothing new in this. It has been an aim of electrical engineers from the earliest days of public electricity supply. The committee will have an opportunity to co-ordinate information and to canalize effort that should tend to further this aim.

Special tariffs as a means of promoting off-peak consumption were the origin of differential rates for power and lighting. They have been applied to water heaters and other electrical apparatus, either embodying the thermal-storage principle or capable of being disconnected without undue inconvenience during certain hours. Time switches and selective switching, e.g., from cookers to water heaters and vice versa, provide examples. Centralized control by undertakings has also been successfully employed in conjunction with relays on consumers' premises. Such tariffs have, it should be noted, been devised to encourage off-peak use and not to penalize peak-hour use, the objections to and difficulties entailed in which we have previously pointed out.

The "Cold-Weather Friend"

Outstanding among the problems for the attention of the committee is how to deal with the "cold-weather friend" of electricity, whose chief use of his supply may be to prevent pipes from freezing during cold snaps, without penalizing others who normally rely upon electric heating in all seasons. Even were a differential charge for heating practicable, it would not be equitable. There is much to be said in principle for the suggestion made by a contributor to our last issue that consumers

should be allowed freedom to choose which of their appliances they will do without when the necessity arises.

While in its immediate bearing, peak control will have to be considered in the light of what can be done without diverting labour and material that could be employed in furthering the contribution of electricity to national commitments, the attitude adopted is of importance in its bearing on future developments. The approach to better conditions of usage should be through load-factor improvement rather than through a mere limitation of peaks.

Price Pegging

THE memorandum on prices and profits submitted by the Federation of British Industries and associated organizations to the Chancellor of the Exchequer demonstrates how difficult it is for one side of industry and commerce to take steps to prevent the progress of inflation. The signatories recommend the fixing of dividends at a level not higher than those last paid and the stabilization of prices, but show how impossible it is to impose such measures on their constituent members whose products and conditions vary so widely. They re-stated the truism that only increased productivity could reduce costs and prices. It was complained that the time allowed for clearing up a number of points arising under the Board of Trade's price freezing Orders was too short; subsequently the Board of Trade announced that the date of operation of these Orders was to be postponed from 15th March to 26th April.

Domestic Tariffs

A GREATER measure of uniformity in tariffs for residential supplies has long been regarded as desirable. The question is expected to receive the early attention of the Area Boards when the British Electricity Authority takes over responsibility for the service and consideration can be given to a report which is understood to have been drawn up by a committee appointed by the Electricity Commissioners. The tariff proposed will presumably be of the two-part type, and the variable-block form has several advantages as mentioned in the 1944 report of the I.E.E. Post-War Planning Committee. In this issue Mr. G. O. McLean discusses the merits of this tariff in the light of deductions drawn from his experience of consumers in a widespread area.

The Register's Future

LAST week we mentioned the apprehensions of electrical contractors regarding their future under a nationalized electricity supply system. The reference was particularly to the E.C.A. but the National Register of Electrical Installation Contractors is equally concerned. Its function is also to secure good workmanship but not directly to protect the business interests of the registered. If electrical installation work were to be monopolized by the Area Boards the Register would have little reason for continuance. If, on the other hand, the new authorities consider that this work may safely be left to private enterprise the Register should be recognized as one means of ensuring safe and sound installations and it would be greatly strengthened by that recognition.

Wind Power

REGARDING the report of the investigations being made by the E.R.A. into the potentialities of large-scale wind generation which appeared in the *Electrical Review* of 6th February, a reader serving with B.A.O.R. states that just before the war a German engineer named Honnef worked out designs for units of about 5,000 kW with 1,000-ft towers. Our correspondent believes that an experimental set with a 400-ft tower has been constructed and put into operation within the past eight years. He has seen a treatise by Honnef, which bore evidence of a good deal of research on the subject, though he cannot now trace it. Perhaps other readers might be able to throw light on this subject.

British Electricity Stock

FULL details were published last week of the methods of exchanging British Electricity Stock for existing electricity supply securities, although actual details of the terms of issue of the stock will not be divulged until 1st April. In general (there are only three or four minor exceptions) the valuation of stocks and shares is that anticipated by the Stock Exchange. The total value of securities involved is over £300 million.

Recorder Time-marking

Simple Device of Drum Cameras

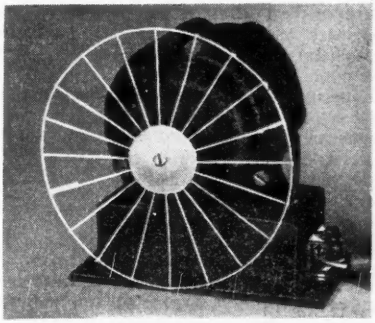
By J. C. Needham, B.Sc., and L. H. Orton, Ph.D., F.Inst.P.

THIS time marker causes a series of discontinuities in a line on a photographic film, which also serves as a datum line. It was devised for a cathode-ray outfit incorporating a variable-speed drum camera for continuously recording over a period approximating to 0·5 sec at a film speed of about 10 m/sec

An essential operational feature demanded resolution of the time marks over a fairly wide range of film rotational speeds, while design features required the equipment to be simple and cheaply made of easily available components.

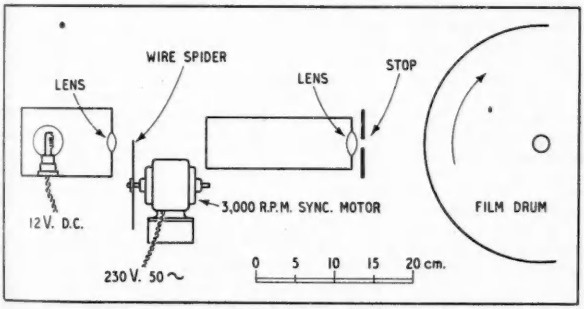
Possible systems include, first, the optical-mechanical use of a light beam interrupted by a vibrating fork, or a rotating sector; secondly, an electrical oscillator of variable frequency with an amplifier to drive a separate small cathode-ray or electro-magnetic oscillograph or, alternatively, the main recorder might be grid or plate modulated; thirdly, a luminous flash triggered by a frequency source and amplifier operating a gas-discharge tube or spark gap.

The first system is relatively simple but, for a wide frequency range, may require interchangeable interruptors and, being mechanical, has a limited upper frequency. The second is more flexible, but necessitates considerable associated apparatus and is wasteful of recording equipment, while beam modulation of the main recorder may be undesirable due to loss or distortion of the trace under examination. The last method, possibly involving pulsed electronic equipment of some power, may introduce the added complication of screening from interference.



Motor-driven wire spider

Practical considerations favoured the optical-mechanical system employing a rotating interruptor consisting of a light wire spider with twenty radii fitted to the shaft of a 230 V, 50 c/sec miniature Scophony synchronous motor, type CIM, of 3,000 r.p.m. A cheap 1-in. focus lens reduces the image of the thin straight filament of a 12-V, 24-W car bulb focused on to the plane of wires of the spider and projected on to the film in the drum camera through a 2-in. focus lens, the system having an overall object/image ratio of 20/1. With the second lens stopped down to F/16 and the bulb glowing at half voltage, a fine sharp trace of adequate intensity is achieved.



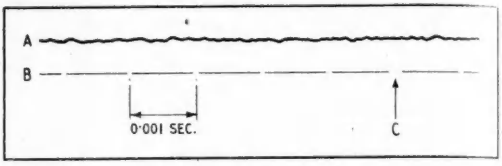
Diagrammatic representation of timing marker

To keep the inertia of the spider sufficiently low for the motor to be self-synchronizing, it is constructed of 2 in. lengths of 24 s.w.g. soldered to a light disc and on to a wire ring at their extremities. The balance of the spider being approximately maintained, particular radii can be thickened to provide added reference timing marks at intervals greater than the normal.

With Kodak RP30 high speed recording

paper on the film drum of approximately 33 cm diameter and rotating at 600 r.p.m. the peripheral speed is 1,000 cm/sec or 10^{-4} sec/mm.

The intensity of recording is such that a suitably resolved time marking for much higher or lower peripheral film speeds can be achieved by adjustment of the number of arms of the spider and/or of the lamp voltage, the system being variable from 50 marks/sec (unless a reduction worm gear is introduced) to about an order higher than the 1,000/sec as shown in the accompanying diagram and, further, this method avoids the inherent defect of the small overall amplitude of oscillation of a tuning fork.



Typical record on camera drum

A, cathode-ray oscillograph trace. B, datum line with time-marking spaces at 10^{-3} sec intervals. C, time mark at 2×10^{-3} sec intervals

Although the timing is not absolute, as is possible with tuning fork control, it is sufficiently accurate for many purposes and provides a convenient scale when a.c. phenomena are being recorded. The percentage error in any individual time interval depends on the accuracy of construction of the spider and increases with the marking frequency. The present spider, quickly constructed without precision methods, is accurate to ± 3 per cent for the 0·001 sec intervals. This accuracy can obviously be improved upon and, since the motor is stable in operation, the timing can be made absolute by mains frequency calibration.

The above system does, at the cost of a few pounds only, record on a datum line a sufficiently accurate time scale for many purposes over a marking frequency range from 50 to over 10,000 sec, and of suitable resolution for film rotational speeds up to about 100 m/sec.

Paris Domestic Equipment Exhibition

From Our Own Correspondent

ONE of the most encouraging things about the *Salon des Arts Menagers* held in Paris this month was that orders could be taken on the spot for most things, delivery being guaranteed within a reasonable time.

There were many types of electric cookers on view, and small electric ovens weighing only 25 kg, for roasting, grilling, pastry making, etc. The Celt automatic coffee pot is an elegant appliance; the coffee quickly made and when it is ready the pilot light is automatically extinguished. Electric bed warmers appeared in abundance at the Salon. In addition to the usual type electric irons, Selful showed a cordless thermostatic model.

Ozonair showed a whole series of domestic air conditioning apparatus, the smallest loaded at only 2 W. It is emphasized that no chemical product is used, the apparatus functioning solely on electricity.

In typical furnished rooms Mazda lamps showed the correct lighting to give the best results for diverse occupations such as domestic work, reading a book or newspaper, sewing, etc. Electrogel had an imposing array of refrigerators. Another concern (Spanded) besides showing vacuum cleaners, demonstrated a method of electrical cleaning of carpets which obviates the need for the carpet to be moved.

Electric washing machines attracted much attention. The Concord apparatus, shown in different sizes, boils, washes and rinses washing automatically. Perclima exhibited a wide range of washing machines, refrigerators, and vacuum cleaners. Emde showed one of the cheapest vacuum cleaners (110 and 220 V) at 5,750 francs (under £7). In addition to the radiators, vacuum cleaners, etc., shown by this company, a novelty in the shape of a hand-dryer was exhibited. Working on 110 and 220 V a.c., the apparatus is guaranteed to dry hands in 30 seconds and is recommended for use in restaurants, hotels, clubs, by doctors, dentists, hospitals, ministries and banks. The cost is 18,700 francs.

Midland Television Station

The British Broadcasting Corporation has acquired a site at Sutton Coldfield for a television station to serve the Midlands and constructional work has already begun. The power of the vision transmitter will be 35 kW and that of the sound transmitter 12 kW—twice and four times the power respectively of the transmitters at Alexandra Palace. Contracts for the transmitters have been placed with Electric & Musical Industries, Ltd., and the Marconi Wireless Telegraph Co., Ltd.

The National Outlook

Economic Survey for 1948

PROSPECTS and targets in the light of which the Government intends to plan during the year are set out in "Economic Survey for 1948" which was published last week as a White Paper (H.M. Stationery Office, 1s.). A foreword states that the most important uncertainty is whether aid under the European Recovery Plan will be forthcoming, and in what form. On this point the White Paper warns that if there is no certainty of aid by the middle of this year, the resulting inevitable cuts in imports would affect raw materials as well as food, and so cause serious unemployment.

The Export Position

Dealing with the export position, it is stated that for the most part the targets published in September last have been accepted as reasonable, but revision is necessary because in certain of our most important markets it is becoming increasingly difficult to sell some of our products; and because the serious shortage of steel has affected production plans. In the September figures the national target was expressed as 160 per cent; the revised target is 150 per cent of the 1938 volume. A summary of proposed targets (monthly rates at the end of 1948) includes electrical goods and apparatus at 235 per cent of the 1938 volume (£7,000,000 at forecast end-1948 prices). An estimate is also given of the volume of exports in the first and second halves of the year: for electrical goods and apparatus the figures are as follows:—

	1947			1948 (forecast)		
1938	Jan-June	July-Dec.	Total	Jan-June	July-Dec.	Total
100	148	179	164	199	210	205

For machinery of all kinds, including electrical, the end-1948 target rate is 203 per cent of the 1938 volume (£23 million at end-1948 prices). The total for the year is estimated at 177 per cent of 1938 (158 per cent actual in 1947).

The second part of the White Paper is concerned with targets for home production and a warning is sounded that we shall be hampered throughout the year by the main limiting factors of dollar and steel shortage. The expansion of the engineering industries, very necessary from a long-term point of view, has reduced the available steel per head in those industries well below the 1938 level, and an inevitable consequence has been interruptions in the flow of production. The planned expansion of steel capacity will only begin to show significant results in two or three years' time.

In electricity supply there are two separate problems—generating capacity shortage in relation to the rising peak demand, and the claim on our coal supplies. The programme for new stations and extensions provides for a very large expansion in the next years and makes heavy claims on steel. It is by no means certain, the White Paper states, that it will be possible to adhere to the full programme once the most immediate shortages have been met.

A table gives the estimated peak capacities and the surplus or deficit over estimated peak demand in the ensuing years, as follows (million kW):—1947-48, 9·53 (−1·42); 1948-49, 10·55 (−1·13); 1949-50, 12·0 (−0·45); 1950-51, 13·29 (+0·05); 1951-52, 14·57 (+0·5); and 1952-53, 15·78 (+0·89).

The figures include old plant much of which is approaching the end of its useful life. The estimated future peak demands correspond to past trends and assume adequate domestic coal supplies, severe winter conditions and no staggering of the industrial load. Referring to load-spreading during the past winter, it is stated that the sum of the regional targets would yield a maximum reduction of 1,781,000 kW, and an actual reduction of as much as 1,000,000 kW has probably been secured. The importance of reducing or spreading the domestic load is stressed.

Industrial Targets

To give expression to the nation's industrial needs, targets have been set for certain industries and these will be added to from time to time. One item deals with electricity generating plant out of commission at the end of the year which it is planned to reduce from 1,450,000 kW to 1,300,000 kW.

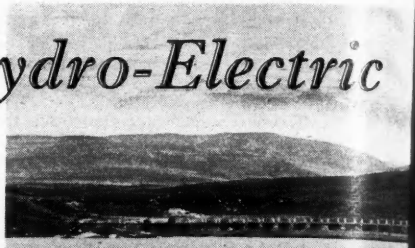
Next, capital development in 1948 is referred to, followed by man-power, national income and consumption. A table of the distribution of industrial population puts the end-1948 number for metals and engineering manufacture at 2,900,000 compared with 2,876,000 at the end of 1947.

A concluding summary says that 1948 remains full of uncertainties, but nothing in the Survey throws any doubt upon the ultimate capacity of our people to regain their economy, strength and stability.

Fluorescent Lighting of Colliery

The British Thomson-Houston Co., Ltd., has received a contract for the supply of fittings for the installation of fluorescent lighting at Cambois Colliery, the first colliery to be illuminated in this manner in the Northern Division of the National Coal Board. The installation is being undertaken by the colliery's staff.

The Major Hydro-Electric

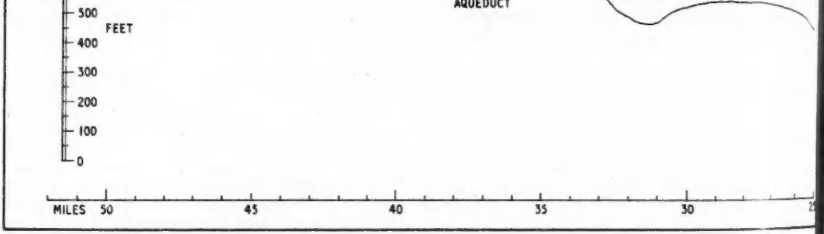


HIGHLANDS LOAD BUILDING — IV

OUR arrival in the Rannoch area, vide *Electrical Review*, 5th March, p. 343, necessitates the longest halt or series of halts of our tour, for this is the scene of the major hydro-electric scheme of the undertaking. Over an area of about 380 sq miles in the vicinity of Lochs Ericht, Rannoch and Tummel watersheds are made use of to the extent of providing for about 70,000 kW of maximum demand through the media of two major reservoirs in the shape of Lochs Ericht and Rannoch, and two generating stations so situated as to employ the considerable differences in the water levels between Lochs Ericht and Rannoch in one case, and Lochs Rannoch and Tummel in the other case.

Considerable diversion and damming is involved in this scheme, and probably the best way of presenting the story in outline suitable as a background to our load-building story is to refer to the major water path sequence in terms of water levels. The highest point is Glas Mheall at 3,037 ft O.D., the area around which drains into the Edendon Water 12 miles or so due north of Dunalastair where, at a point 1,628 ft. O.D. a dam and a tunnel divert water to Loch An Duin (1,592 ft O.D.) a little further north. From here the Allt Loch an Duin carries water down to Loch Bhrodain to the north again where the level is 1,452 ft O.D. Amhain Ghaig carries water from here further north to Loch An T-Seilich at the north end of which a dam creates a reservoir with a top level of 1,403 ft O.D. Just before the dam, however, the water is supplemented by a supply from the Allt Bhran at 1,422 ft O.D. by means of a tunnel.

From the 1,386 ft O.D. level at Loch An T-Seilich a tunnel conveys water about five miles due west to Loch Cuaich (1,303·5 ft O.D.). Part of Allt Cuaich, an aqueduct and finally a pipe line then carry the water south westerly to the north-east end of Loch



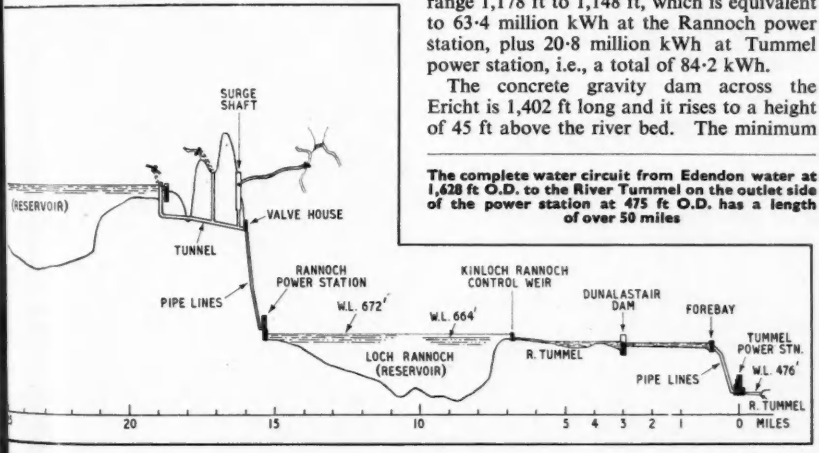
Scheme

The dam at Loch Ericht provides a reservoir with an available storage of 6,662 million cu ft which is ebuivalent to 63·4 million kWh at the Rannoch power station

Ericht in which the maximum water level has been raised to 1,178 ft O.D. at the spillway by a dam across the River Ericht at the south-west end of the Loch. Just before the entry to Loch Ericht, however, water is diverted into the aqueduct and pipe line by aqueducts from the Rivers Bhathaich and Truim. Further, at Dalwhinnie on the Truim, near the Loch entrance, is a dam with a floating weir which is designed to pass prescribed amounts of water down the fish ladder and down-stream for the benefit of salmon at all levels of the river up-stream.

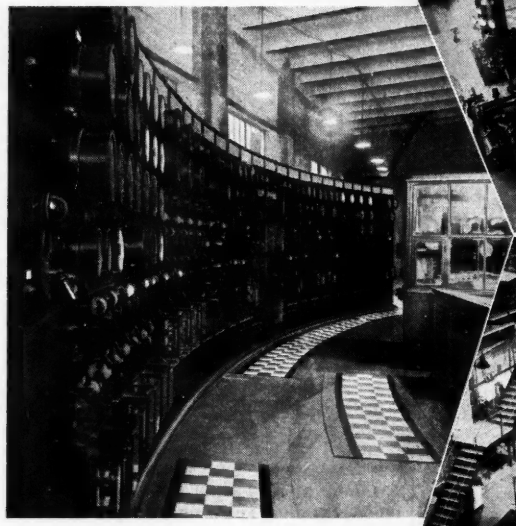
All the work so far described and three further diversions directly into Loch Ericht, one into Loch Garry (1,364 ft O.D.) by an aqueduct from the River Dubhaig, one from Loch Garry five miles due east of the centre of Loch Ericht, by means of a tunnel, and one from Allt Ghlas (1,209 ft O.D.) at the south-west end of Loch Ericht, by means of an aqueduct, have contributed to making Loch Ericht, which is about 17 miles long and about ¾ mile wide, the major reservoir of the hydro-electric scheme, with an available storage of 6,662 million cu ft in the level range 1,178 ft to 1,148 ft, which is equivalent to 63·4 million kWh at the Rannoch power station, plus 20·8 million kWh at Tummel power station, i.e., a total of 84·2 kWh.

The concrete gravity dam across the Ericht is 1,402 ft long and it rises to a height of 45 ft above the river bed. The minimum



The complete water circuit from Edendon water at 1,628 ft O.D. to the River Tummel on the outlet side of the power station at 475 ft O.D. has a length of over 50 miles

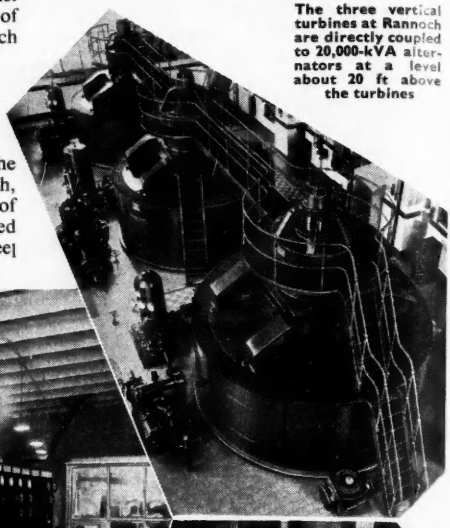
draw-off level is at 1,148 ft O.D. at the intake tower inside the dam, and the water passes through a vertical shaft and a tunnel $2\frac{3}{4}$ miles long to a valve house at the top of the pipe lines directly serving the Rannoch generating station on the shore of Loch Rannoch. The tunnel is of horseshoe section and equivalent to a 12-ft 3-in. diameter pipe. At a point where the tunnel crosses the bed of the River Ericht which used to convey the water from Loch Ericht to Loch Rannoch, the tunnel level of 1,061 ft is above that of the river bed, so that the water is conveyed across the bed by a concrete-lined steel pipe line with an internal diameter of 11 ft.



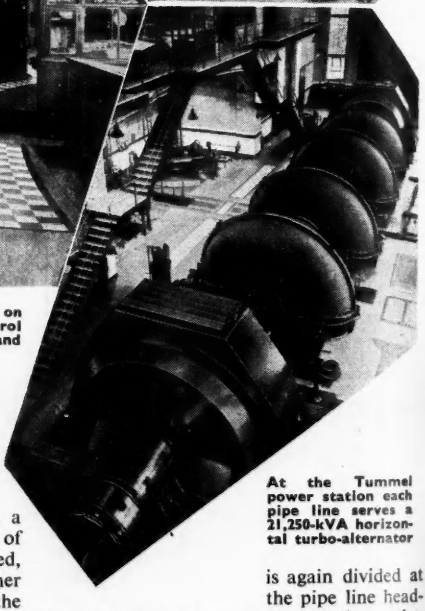
Above the Tummel switchroom is a control floor on which are situated the impressive curved control board and control desks (right) for the hydraulic and electrical supervisory systems

At a point nearly two miles from the main dam a vertical shaft rises from the tunnel to a top level of 1,225 ft O.D., and into this shaft water is diverted from the river Mheugaidh. Near the valve house a surge shaft also rises from the tunnel, a safety measure in the event of the flow of water to the turbines being suddenly arrested, and into the surge shaft there is another diversion by means of an aqueduct from the Killichonan Burn and, in turn, to this by an aqueduct from the Aulich Burn.

Immediately before the valve house the tunnel is bifurcated and, in turn, each branch is again divided at the pipe line headings at the valve house. One heading outlet, however, is sealed off, for there are only three



The three vertical turbines at Rannoch are directly coupled to 20,000-kVA alternators at a level about 20 ft above the turbines



At the Tummel power station each pipe line serves a 21,250-kVA horizontal turbo-alternator

A spectacular feature of the Dunalastair dam is the fish ladder with 18 pools

pipe lines down to the power station. The valve house level is 1,026 ft O.D., and the top water level of Loch Rannoch in floods is 674 ft O.D.

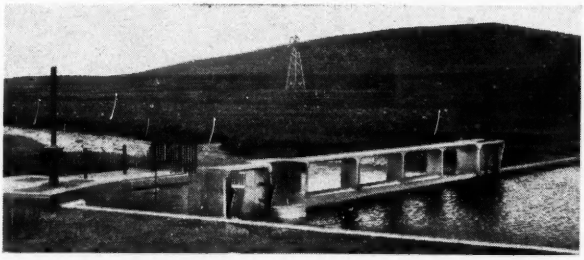
Each of the three existing pipe lines serves an E.E. 22,000-h.p., 500 - r.p.m. Francis vertical turbine which drives a B.T.H. 20,000-kVA alternator. From the turbines the water is discharged into a tail race which conveys the water to Loch Rannoch some 540 ft away. The water supply to each turbine is controlled by an Escher-Wyss rotary valve which is automatically closed in the event of the water velocity exceeding the normal value by more than 50 per cent. The power house is a steel and concrete building measuring 95 ft long, 60 ft wide and 44 ft high from the generation floor level, and about 60 ft high from the turbine floor level.

At 20 ft above the generator floor level is a wide control gallery immediately under which is the main 11-kV generator and outgoing switchgear, which has a breaking capacity of 750 MVA, from which the energy is conveyed to two adjacent substations to be stepped up to 132 kV in one case and 33 kV in the other case. In the 132-kV substation are three B.T.H. 20,000-kVA, 11-kV/132-kV transformers connected in series with voltage-regulations boosters, while in the 33-kV substation are two 5,000-kVA, 11-kV/33-kV Hackbridge transformers and one 10,000-kVA Bruce Peebles transformer equipped for on-load tap changing. On the latter transformers there is also a 2,200-V tertiary winding which, via suitable transformers, affords l.v. supplies for the station auxiliaries. Air-break switches on the 132-kV main outdoor-substation transformers are used for isolation purposes only, the on-load switching being effected by the 11-kV oil circuit breakers in the power station. Oil circuit breakers control the outgoing lines from the 33-kV substation.

At the east end of Loch Rannoch at Kinloch Rannoch is a control weir by which the 7·35 sq miles of storage area is raised

The Rannoch valve house level is at 1,026 ft O.D. and the normal top level of Loch Rannoch at 672 ft O.D.

about 8 ft, and the 1,637 million cu ft of storage water thus available under the most favourable conditions is equivalent to 4·5 million kWh at the Tummel power station



At Dalwhinnie a floating weir passes prescribed amounts of water downstream for the benefit of salmon at all levels of the river up-stream

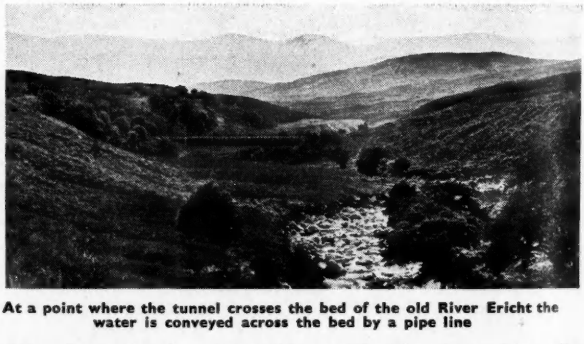
where the tail-race level is at 476 ft O.D. From the weir, which has three sluice gates which are electrically operated from the Tummel power station, the water flows along the River Tummel for about 4 miles due east to a dam at Dunalastair which has created a small reservoir on the river bed sufficient to take care of the daily load fluctuations at the power station. Two large sluice gates and four syphons pass the flood water, and a spectacular feature of the dam is a fish ladder with 18 pools which enables the fish to proceed above the dam.

An aqueduct carries the water from the dam 2¾ miles due east to a forebay at a top level of 646 ft O.D., to which the two 650-ft, 12·5-ft diameter power-station pipe-lines are connected. At the power station each pipe-line serves a 24,000-h.p., 300-r.p.m. horizontal double-runner, twin-spiral-casing, single-discharge Francis turbine, Boving design and Markham's manufacture, which is directly coupled to a 21,250-kVA, 11-kV B.T.H. alternator. A 400-kW turbo-alternator was originally installed at Ericht to afford a supply during the constructional period and now serves at Tummel for emergency local supplies.

The power-station building is an attractive steel and concrete structure on the north bank of the River Tummel, and it measures about 175 ft long, 96 ft wide and 50 ft high above the alternator floor level. There is no basement level such as is required for the vertical turbines installed in the Rannoch station.

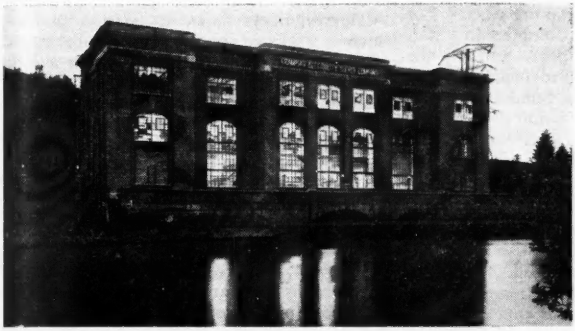
Main generator and outgoing 11-kV switchgear are situated at the turbine-floor level in an annexe, and immediately above this is a control floor on which are situated the impressive curved main remote control board, and the remote control desks for the automatically operated hydraulic and electric systems. The turbines discharge into a short tail race which directly connects with the river at a point about three miles due west of Loch Tummel. The water circuit outlined, from Edendon Water at 1,628 ft O.D. to the outlet side of the power station on the River Tummel, although it is geographically very roughly almost circular, represents a longitudinal distance of over 50 miles.

The hydraulic-system control desk in the Tummel power house accommodates all the relays, indicators and recording instruments required for controlling and indicating the operations at the various gates, etc., at the Dunalastair Dam, about three miles away, and at the control weir, about eight miles away. The instruments are disposed in a diagram on the desk to represent the geographical positions of the components they



At a point where the tunnel crosses the bed of the old River Ericht the water is conveyed across the bed by a pipe line

control or indicate, so that there is an accurate presentation on the desk of the conditions prevailing on the system at any one time. At the intake dam position on the diagram are two telegraph-type relays for controlling the aqueduct gates, together with the transmitting potentiometers, water levels, etc. Facilities are provided for the remote control of the gates to positions predetermined at the desk, automatic control during normal working and automatic emergency closure. Continuous indications are also given of the dam gate levels, dam water level, aqueduct water level, loss of head through the screens, rate of water flow and power supply failure. At the control weir position on the diagram facilities are provided for the following controls and indications: weir gates, Loch Rannoch water level, water flow, supply failure. Similarly there are also facilities for the control and/or indication of: forebay water level, tail-race water level, pipe-line water flow and emergency closure of the forebay gates. The control system was established by Standard Telephones & Cables, Ltd., and it employs a comprehensive system of pilot lines between the power station and the relevant parts of the hydraulic system operated at 100 V d.c.



The Tummel power station building is a steel and concrete structure on the north bank of the river Tummel

The 11-kV supplies from the Tummel power house are taken to an adjacent outdoor substation where there is provision for stepping up the voltage to 132 kV and 33 kV in a similar manner to the arrangement at the Rannoch substation, with two 21,000-kVA, 11-kV/132-kV, and two 5,000-kVA, 11-kV/33-kV, step-up transformers. But in this case there is also a switching station which provides for the interlinking of the Rannoch and Tummel supplies by the special four-circuit (two 132-kV and two 33-kV) steel-tower line between the stations already referred to.

Outgoing from the Tummel substation there are also the 132-kV lines to Abernethy in the south-east; the 33-kV lines to Callander in the south; the 132-kV and 33-kV lines to Keith in the north-east; and the 33-kV line to Forfar in the east; as well as 11-kV lines for local supplies. Further, there are the 33-kV lines from Rannoch running west and south-west to Kinlochleven and Argyllshire.

We have already indicated the valuable supervisory control and communication facilities which are provided between Tummel and Abernethy by the carrier current system by which high-frequency communication and operating currents are superimposed on the normal 132-kV, 50-cycle supply currents. By this means the oil switches can be opened and closed and the currents and voltages in each circuit indicated. A mimic diagram is provided on the supervisory control desk in Tummel power station, and this includes the indicating instruments and operating keys. By this system Tummel may, at any moment, exercise priority over any operation in progress. The supervisory system was installed by the General Electric Co., Ltd.

Domestic Science Scholarships

THE Caroline Haslett Trust has recently announced a third series of scholarship awards. The scholarships are worth £150 a year and enable girls to train at recognized domestic science colleges before taking up a career in electrical housecraft. The successful candidates for 1947-48 were Miss K. A. McBoyle (Edinburgh), Miss S. Osborne (Musselburgh), Miss B. Brownsett (Stockport), Miss E. A. Bartholomew (Bramhope, Leeds), Miss B. Drewery (Wakefield), Miss F. M. K. Rubery (Bath) and Miss Ena Graves (Ashford, Kent).

The Caroline Haslett Trust is now inviting applications for the third Travelling Exhibition, which will be tenable in Canada from the beginning of August. Applicants must possess the E.A.W. Diploma in Electrical Housecraft.

Views on the News

Reflections on Current Topics

INTEGRATION of the electricity supply industry is an omelette involving the breaking of many eggs. About six hundred companies and electricity committees will be dissolved and several associations will either disappear or be drastically reconstituted. All this officially happens on 1st April and in consequence there is ensuing a period of obsequies.

* * *

On Friday last week the Central Electricity Board held its final meeting. This week the Electricity Supply Joint Committee is holding a farewell luncheon and the British Electrical Development Association's last annual meeting, in its present form, is taking place. For next week the Electricity Commission's staff has arranged a farewell party and on the 31st of the month the Provincial Electric Supply Association and the London & Home Counties J.E.A. are holding separate luncheons at the Savoy Hotel and will no doubt exchange fraternal greetings—or mutual commiserations.

* * *

Reading through the names of the engineers appointed to the staffs of the British Electricity Authority, the Divisions and the Area Electricity Boards it seemed to me that the names of municipal electrical engineers were more familiar than those from the company undertakings. Is this possibly due to the fact that the companies rather discouraged any attempt to publicize any but their top men, including directors, while borough electrical engineers were more free to express their opinions and keep their names before the industry ? The municipal men have had more opportunities, too, especially through the I.M.E.A., to which there has been no strictly company counterpart. I trust that a different form of public ownership will not result in a change in this position. In large groups there are but a few " top men " and many " subordinates "—that is the real danger.

* * *

The war-emergency extensions of B.S.7 to cover rubber substitutes occasioned some anomalies which should be squared up. Interesting technically as I found the suggestions made by Mr. W. Bowen in his I.E.E. Installations Section paper last week for a new cable specification based on performance that would include polyvinyl chloride and polythene as well as rubber, I doubt their practicability. British Standards must take into account the capabilities of the average factory and also allow users to check compliance. They also require agreement with the proposals by the various parties concerned, and this the discussion showed to be lacking. Although the primary object of Mr. Bowen's paper will probably not be achieved, the bringing together of data in this form for public discussion has its own value.

* * *

Developments in power station practice, such as a greater use of 3·3-kV auxiliaries and d.c. for boiler control, have led to a large increase in the number and variety of cables. I am told by B.I. Callender's that a 50,000-kW alternator with its associated auxiliaries, including those in the boiler house, may call for more than 750 separate power and control cables of a total length of over nine miles. This supports the plea of Mr. W. H. Lythgoe in his I.E.E. paper last November for a reduction in the number of standard cables. The trend observed during the past year towards the standardization of overall finish may be regarded as a step in the right direction, i.e., bare wire armour over a fireproof bedding for multicore cables and a fireproof braid for plain lead-sheathed single-core cables.

* * *

Mr. J. Eccles did not overstate the position when he recently submitted that 50 per cent more power would be required in factories to enable Great Britain to hold its own in world markets. A pre-war estimate of the horsepower per worker was 3·5, which was only two-thirds of that found in the United States, and since then the proportion has probably not shifted in favour of this country. Moreover, more than a quarter of the amount in 1939 was applied mechanically. What can be done to give workers more power will depend upon the generating plant capacity available to meet the increased demand, including that required to make the motors and other electrical apparatus of more than twice the kW rating of the alternators.

—REFLECTOR.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Peak Control

ON reading your leading articles on the subject of peak control and especially that in your issue of 27th February with reference to the ripple-control system, it struck me that evidently water storage heaters on night-tariff are not much in use in Great Britain. In this country such heaters were introduced long before the war on a large scale with the double purpose of giving the consumers the benefit of a very low rate (at present roughly 0·5d. per kWh), covering only the variable portion of the kWh production price, and at the same time increasing the night load and load factor of the power stations. There was no necessity then to reduce peak loads, but now this system proves very useful for this third purpose as well.

The heater or heaters require a separate circuit tapped off before the house service meter via a time-switch, which closes the circuit from 11 p.m. to 7 a.m. and in some cases also from noon to 1 p.m. The supply undertaking charges a fixed monthly rate according to the size of the heater as the kWh consumption can be exactly determined without a separate meter.

It is true that a separate circuit is required, which must be sealed so as to avoid frauds, but a separate circuit would also be required for the ripple system. There can be no doubt that the system is infinitely cheaper and easier to install than the ripple-control system, but of course, flow heaters would have to be replaced by storage heaters. This latter replacement can only be of advantage to the supply authority, as it spreads the load for a given quantity of water to be heated.

The Hague, Holland. H. GIESBERS.

WITH reference to the setting up of a committee by the Minister of Fuel and Power to investigate the possibility of limiting demands of domestic and business premises, consumers can, I believe, by exercising diversity, meet the requirements without making sacrifices.

I do not favour the tariff method, which discriminates between those able and those not able to pay.

The method to my mind best suited to the situation, is to set each consumer a target during the critical periods, beyond which restriction is necessary. A simple device operated on the electromagnetic principle would do the job. This consists of two relays, working in conjunction and, when both are operative, providing means of giving a visual or audible warning signal, or, if desired, of cutting off the supply of electricity. The maximum load value to be permitted during difficult times is obtained by energizing a simple relay by a series current coil carrying the total load current, and preset for each consumer's installation, taking into account the installed demand and diversity factor.

Master control at times of peak loads is provided by the second relay which is a tuned reed frequency relay set to operate at frequencies of, say, 49 cycles and below. This gives absolute control by the Central Electricity Authority who have the power to control frequency.

If visual or audible warning only is provided, and this I think is desirable except in certain cases (as isolation of supply can cause complications to both supply authority and consumers), it is left to consumer to respond to the warning. Audible warning would probably be most effective.

The device is simple, and therefore would be cheap to manufacture. Its dimensions can be small and it would be easy to install and trouble free. The instrument could be made universal by having a tapped winding on the series coil, and it might even be possible to utilize the single series-wound electromagnet for operating both functions of the device, and to use the vibrating reed to some advantage as a contact breaker. The practicability of this device depends on the question of frequency variations. If this can be done, the rest is easy.

Southend-on-Sea. F. J. PRYOR.

A Lamp Weakness

AN experience of my own coupled with that of several others to whom I have described it, appears to show a defect in the present construction of 75-W and 100-W lamps which calls for the attention of designers and manufacturers.

When recently I switched on a standard lamp carrying a 100-W lamp mounted

vertically there was an almost blinding flash within the bulb and both fuses in the sub-circuit blew. These were 5-A fuses and as the wires had been volatilized it was clear that a short circuit had caused a very heavy current to pass. Subsequent investigation showed that the wires supporting the filament had apparently collapsed and come into contact.

I have since heard of several similar experiences and an electrician to whom I described what had happened tells me that he has lately had a number of calls due to the same cause.

It would appear that at any rate in some 75-W or 100-W lamps the wires now used for supporting the filaments cannot stand up to the working temperature and are liable to collapse if the lamp is upright. There is no need to suggest to your readers the serious results that might follow such a short circuit. Which of us has not found before now a 5-A fuse wire replaced by 25- or 50-A wire or even by the proverbial hairpin?

I feel that this is a matter which should receive the immediate attention of lamp manufacturers.

Berkhamsted. R. W. HALLOWS, M.A. (cantab.), M.I.E.E.

Municipal Trading

THE following statement was made in the *Manchester Evening News* of 4th March:—

> "Bury Council is to close its direct labour installation section of the electrical department. It is claimed that it had developed beyond its original plan, and was competing "unfairly" against local contractors."

To one who has spent a lifetime in the electrical industry, and over twenty years as an electrical contractor, afterwards moving into the wholesale distribution sphere, the decision of the Bury Council has very great significance.

*London, S.E.*16. J. P. RYAN, (KIRK ELECTRICAL INDUSTRIES, LTD.).

Domestic Space Heating

SEVERAL inconsistencies in Mr. Ackery's article of this subject in your issue of 12th March require clarification. Mr. Ackery deplores an increase in the two-part tariff on the grounds that it would have an adverse effect upon development. His alternative proposal is compulsory curtailment of the service. Surely this is not calculated to stimulate domestic electrical development.

The proposed curtailments would presumably be effected by ripple-control relays cutting off the supply when the demand reached a predetermined value. As it has recently been admitted by an important body to be impossible to determine a reasonable demand for each consumer it would be interesting to learn how and by whom this figure is to be fixed.

It would also appear that the installation and maintenance of 12 million relays would be a considerable item. When paying this sum for the privilege of having his supply cut off the consumer may think that the money might be more usefully employed in the erection of generating stations.

The most astounding part of the proposal is that while it is in the national interest to reduce the demand, the consumer can avoid the inconvenience of load shedding by the payment of an additional fee. Thus if the majority of 12 million potential consumers availed themselves of this "black market" offer, what guarantee would exist against the risk of a cut?

While it is agreed that the demand for space heating for domestic purposes is on an unprecedented scale and endangers the continuity of essential supplies, it is to be hoped that there will be a positive solution to the problem and not, as is frequent these days, one of a negative character.

South Harrow, Middx. P. A. ROWLAND.

THE method of load control which forms the subject of Mr. E. M. Ackery's article on "Domestic Heating" in your 12th March issue was first suggested by Mr. A. H. Dykes some thirty years ago (*Proceedings* of the I.M.E.A. Convention, 1920, p. 168). An improvement was described by me in two I.E.E. papers (*Journal I.E.E.*, 1941, Vol. 88, Part II, p. 373, and 1943, Vol. 90, Part I, p. 323).

In its modified form, the relay does not simply trip, but automatically keeps the demand at the agreed level—irrespective of the excess load in circuit; the level can be increased by centralized control, if system conditions do not require maximum restriction and in order to effect a smooth transition.

*London, W.*1. P. SCHILLER.

Books Received

The Motor Cyclist's Workshop. Fifth Edition. (Pp. 147 illus.) Published for the *Motor Cycle* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, S.E.1. Price 3s.

PERSONAL and SOCIAL

News of Men and Women of the Industry

ON 5th March, at a luncheon at the Connaught Rooms, London, Mr. V. Watlington, the independent chairman of the Electrical Fair Trading Council, presented to **Mr. Felix A. Rogers** a wireless set, a coffee percolator and a cheque to mark his retirement from the secretaryship of the Council. Mr. Rogers in his reply, said he had now completed forty years in the electrical industry and he was proud to have devoted fourteen years of that period in service as the first secretary to the Fair Trading Council. By the operation of the Fair Trading Policy, he had seen chaos give way to orderly trading and it was his hope that in the future the Council's work would be even more widely appreciated.

Mr. C. Bradley, M.I.E.E., whose appointment as general manager and engineer to the Finchley Corporation Electricity Department was reported in our last issue, has been with the Department since the domestic development programme commenced in 1936, when he was appointed consumers' engineer. He was previously with the Dumfries County Council, being responsible, under the county electrical engineer for much of the design and construction of the distribution scheme. He was appointed deputy general manager and engineer at Finchley in January, 1943, and during the absences abroad of Mr. C. R. Westlake (whom he succeeds as "chief") he was appointed acting general manager and engineer.

Mr. C. Bradley

More than 300 members of the Fusegear Works of the **English Electric Co., Ltd.,** and their friends attended a carnival ball and supper at Reece's Restaurant, Liverpool, recently. The function took the place of the annual dinner-dance in view of the food restrictions and to enable as many as possible to be present. The duties of M.C. were carried out jointly by Mr. J. T. Wilson (fusegear development)and Mr. L. R. J. Martinelli (fusegear sales). Mr. H. Simmonds (manager, Fusegear Section), who presided at the supper, made a brief speech drawing attention to the Section's expanding export business and welcomed the visitors. Mr. G. W. E. Hooper (secretary to the company) responded. A bouquet of carnations was presented to Mrs. Simmonds by Mrs. J. Jonker on behalf of all members of the Section. Others present included Mr. E. B. Banks (commercial manager), Mr. J. Rogers (general manager of works), Mr. G. F. Sills (manager, Northern Territory, Manchester), Mr. F. R. Smith (manager, Liverpool Works) and Mr. T. F. Turner (chief purchasing agent). During the evening an excellent cabaret was provided by fusegear personnel.

Mr. J. R. Edwards, who has been appointed assistant, engineering (communications), at the Railway Executive headquarters, joined the former Midland Railway as an apprentice in the telegraph laboratory in 1916 and ultimately became responsible for the communications section of the L.M.S. Signal and Telegraph Department under the signal and telegraph engineer.

Mr. Leonard Andrews, M.B.E., M.Inst.C.E.; M.I.E.E., has transferred his office and testing equipment to The Hut Laboratory, Stapleford, Nr. Salisbury. (Telephone: Stapleford 258.) **Mr. Raymond L. R. Slacke,** who during the past twelve years has been associated with Mr. Andrews, has taken an appointment under the National Coal Board.

Mr. H. Gibbon has been appointed to the board of A. Cooksley & Co., Ltd., and will be the company's chief technical director, responsible for design and development.

The Radio Communication and Electronic Engineering Association, of which **Mr. L. T. Hinton,** B.Sc., A.C.G.I., M.I.E.E., is chairman, has set up a standing Export Committee to help in augmenting the export of radio communication equipment. This Committee, together with the General Technical and Contracts Committees, are at the service of all members.

Mr. L. T. Hinton

Walsall Education Committee has confirmed the appointment of **Mr. E. Jewitt,** B.Sc., A.M.I.E.E., as principal of Walsall Technical College. We regret that in our issue of 5th March Mr. Jewitt's name was incorrectly spelt. He is at present vice-principal and head of the electrical engineering department (not engineering department) of Derby Technical College.

In this issue the British Electricity Authority invites applications for the post of assistant surveyor in the Estates and Real Property Department at its London headquarters. It is stated that preference will be given to candidates who are members of the Royal Institution of Chartered Surveyors or similar bodies and already engaged in the electricity supply industry.

The B.E.A. is also advertising the post of wayleave officer in the Generating Divisions. Duties include negotiating wayleaves for transmission lines with landowners and tenants; settlement of damage claims; arranging access for construction; supervision of tree cutting, etc.

Mr. A. Bartle, boiler and turbine house superintendent at Barnsley, has been appointed power house superintendent with the Doncaster undertaking.

We are sorry to learn that **Lord Brabazon of Tara** has gone into a nursing home for a knee operation which has necessitated his cancellation of engagements for two or three weeks. Lord Brabazon was to have presided at the annual luncheon and meeting of the British Electrical Development Association, of which he is president, to-day (Friday).

Liverpool Corporation Finance Committee has decided that, pending the appointment of a city lighting engineer, **Mr. C. C. Smith,** A.M.I.E.E., at present deputy city lighting engineer, shall be appointed to the position in an acting capacity at his present salary.

Mrs. A. J. Burrell and **Mr. John H. Hare,** M.P., have been elected directors of Whitehall Electric Investments, Ltd.

The annual re-union of the **Cromptonian Association** (formerly the Association of "Old Cromptonians") will be held on Thursday, 27th May, at the Café Royal, Regent Street, London, W.1.

Obituary

Mr. A. H. Bridge.—Our readers will be sorry to hear of the death on 9th March of Mr. Albert Henry Bridge, formerly commercial editor and a director of the *Electrical Review* for many years. He was seventy-four years of age. Mr. Bridge may be said to have grown up with the electrical industry, for he joined the *Electrical Review* in 1891. In consequence he possessed an intimate and encyclopædic knowledge of all branches—supply, manufacturing, contracting and trading—which equipped him to deal equitably and firmly with the many, sometimes vexed, questions which constantly arose in the evolution and growth of the industry during his forty- seven years with the journal.

Mr. Bridge retired about ten years ago and although his health was not constantly good continued to take a lively interest in the *Review* and the problems of the electrical industry, and his former colleagues will greatly miss his occasional visits to the scene of his former labours. We extend our deepest sympathy to Mrs. Bridge and her family in their loss.

The funeral service was held at the Winchmore Hill Methodist Church on Friday last week followed by a ceremony at Enfield Crematorium.

Mr. P. M. Millns, A.M.I.E.E., founder of Millns Electrical Co., Ltd., Fetter Lane, London, E.C.4, died on 12th March, aged sixty. Mr. Millns was a founder member of the Electrical Wholesalers' Federation, and was a Council member and hon. treasurer for many years.

Mr. E. H. Miller, M.I.E.E., M.A.I.E.E., who since 1929 has been serving with Sangamo Weston, Ltd., in various capacities, died on 12th March at Winchester Hospital after a long illness. From 1902 to 1905 Mr. Miller was successively in the switchgear drawing offices of the Edison Swan Electric Co., Ltd., the Electric & Ordnance Accessories Co., Ltd., and Johnson & Phillips, Ltd., and in the Estimating Department of Elliott Bros. (London), Ltd. In 1906 he rejoined Johnson & Phillips, Ltd., becoming manager of the Switchgear Department, and three years later was appointed chief estimating engineer to Ferranti, Ltd. In 1912 he went to the British Westinghouse Co., Ltd., and was subsequently appointed manager of its Meter and Instrument Department. He rejoined the Edison Swan Electric Co., Ltd., in 1919 as manager of the Meter and Instrument Department, and in 1925 again went to Ferranti, Ltd. Mr. Miller was chairman of the I.E.E. Meter and Instrument Section for 1942-43 and of the Hampshire Sub-Centre for 1945-46.

The late Mr. E. H. Miller

Mr. W. F. Moir.—We regret to report the death of Mr. William F. Moir, chairman and managing director of Cryselco, Ltd., which occurred on Saturday last at his home. Mr. Moir served several terms of office as chairman of the Electric Lamp Manufacturers' Association and was well known to the trade for the part he played in joint committee work for a great number of years. A kind hearted man of wide interests and connections he will be greatly missed by a large circle of friends. The funeral service was held on Tuesday at All Saints' Church, Finchley Road, N.W. Mr. Moir had requested before his death that instead of flowers donations should be sent to the Electrical Industries Benevolent Association.

Mr. L. E. Harvey, who has died at Ilford at the age of seventy-one, was transport manager with South Shields Corporation from 1908 to 1912 and witnessed the introduction of the first electric trams at South Shields.

Mr. E. J. Fouracre.—We regret to announce the death, which occurred on 10th March after some weeks' illness, of Mr. E. J. Fouracre, director and general sales manager of the Westinghouse Brake & Signal Co., Ltd.

WILLS.—**Mr. W. O. A. Baggally,** radio research engineer, left £42,464 (net personalty £42,229).

Mr. H. J. Allcock, deputy to the production director of British Insulated Callender's Cables, Ltd., left £7,308 (net personalty £6,802).

Electricity Appointments

Further Positions Filled

THE British Electricity Authority announces the following appointments in the Transmission and Generation Divisions at its head office:— *System operation engineer:* Mr. R. J. Squire, B.Sc. (C.E.B.); *transmission design engineer:* Mr. F. J. Lane, M.Sc., M.I.E.E. (C.E.B.); *generation design engineer:* Mr. F. Shakeshaft, A.M.I.E.E., M.Inst.F. (C.E.B.); *generation construction engineer:* Mr. C. E. H. Verity, O.B.E., M.Inst.C.E., M.I.E.E., M.I.Mech.E. (London Power Co.); *generation operation engineer:* Mr. J. A. Vice, A.M.I.E.E., M.Inst.F. (County of London E.S. Co.).

The **Midlands Electricity Board** has made the following appointments:—*Deputy chief commercial officer*, Mr. G. W. Abbott (S.W. & S. Electric Power Co.); *deputy chief accountant*, Mr. A. B. Hodson, A.S.A.A. (S.W. & S. Co.); *establishments officer*, Area Board headquarters, Mr. F. W. Cater, A.C.A. (Midland Electric Corporation for Power Distribution, Ltd.; *secretarial assistant and personal assistant to chairman*, Mr. E. Landucci (West Midlands J.E.A.); *assistant purchasing officer*, Mr. A. E. B. Wallis, Birmingham Electric Supply Department). *Sub-area managers:*—North Staffordshire, Mr. H. A. P. Caddell, B.A. (Hons.), A.M.I.E.E. (S.W. & S. Co.); Wolverhampton & District, Mr. F. J. Elliott, M.I.E.E. (borough electrical engineer, Wolverhampton); South Staffs and North Worcestershire, Mr. G. F. Peirson, M.I.E.E. (chief engineer, Midland Electric Corporation); Birmingham & District, Mr. A. C. Evans (Birmingham Electric Supply Department); Central Gloucestershire, Mr. G. D. Johnstone, A.C.A. (general manager, West Gloucestershire Power Co.). *Deputy sub-area manager*, Birmingham & District, Mr. Emil Braathen, M.I.E.E. (chief engineer and general manager, Gloucester Electricity Department); *manager*, Worcester, Malvern, Evesham, Banbury, Stratford & Tewkesbury Districts, Mr. R. Randall, A.M.I.E.E. (S.W. & S. Co.).

The **Southern Electricity Board** has made the following appointments:—

Secretary: Mr. F. W. Kempton, M.A. (cantab.); *legal adviser:* Mr. D. S. Cumberlege, barrister-at-law; *plant and equipment engineer:* Mr. R. H. Abell, M.I.E.E.; *mains engineer:* Mr. K. L. May, M.I.E.E.; *technical engineer:* Mr. R. A. Woods, B.Sc., A.M.I.E.E. Section heads:—*Engineering:* Mr. R. H. Abell, M.I.E.E., M.I.Mech.E. (C.E.B.), Mr. K. L. May, M.I.E.E. (Edmundsons) and Mr. R. A. Woods, B.Sc., A.M.I.E.E. (Birmingham E.S. Dept.). *Commercial:* Mr. J. R. Bennett (Metropolitan E.S. Co.) and Mr. G. E. Taylor (Wessex Elec. Co.). *Accountancy:* Mr. J. Aitken, C.A., A.C.W.A. (Isle of Wight E.L. & P. Co.), Mr. C. A. F. Beaumont, A.C.A. (Metropolitan E.S. Co.) and Mr. L. L. Parry, A.C.A. (Wessex Elec. Co.).

The **North Western Electricity Board** has made the following appointments:—*Administrative officer:* Mr. H. W. Buxton (Manchester). *Sub-area senior officers (electrotechnical engineers):* Manchester No. 1 sub-area, Mr. S. R. Mellonie, M.I.E.E. (Salford); Bolton No. 2 sub-area, Mr. W. D. Sutcliffe, A.M.I.E.E. (L.E.P. Co.). *Consumers' engineers:* Manchester No. 1 sub-area, Mr. W. E. Swale, M.I.E.E. (Manchester); Bolton No. 2 sub-area, Mr. L. Loukes (L.E.P. Co.); Blackburn No. 5 sub-area, Mr. J. B. Ashworth (Blackburn). *Mains superintendents:* Manchester No. 1 sub-area, Mr. F. Linley, A.M.I.E.E. (Manchester); Bolton No. 2 sub-area, Mr. S. L. D. Larcombe, A.M.I.E.E. (L.E.P. Co.); Blackburn No. 5 sub-area, Mr. E. W. Hewlett, A.M.I.E.E. (Bolton). *Publicity and commercial assistant:* Mr. N. H. Bridge (L.E.P. Co.). *Section heads (engineering):* Mr. J. E. Peters, A.M.I.E.E. (C.E.B.) and Mr. K. C. Coop, M.Eng., M.I.E.E. (Blackpool). *Section head (solicitor):* Mr. H. Smith (Wigan). *Co-ordinating officer (commercial):* Mr. W. G. H. Chilvers, A.M.I.E.E. (E.D.A.). *Electrotechnical engineer:* Blackburn No. 5 sub-area, Mr. G. Lee (Blackburn).

Division Announcements

North-Eastern Division. — *Chief generation engineer, operation*, Mr. J. B. Jackson, A.M.I.Mech.E., A.M.I.E.E. (generating engineer, North-Eastern Electricity Supply Co.).; *generating engineers, operation*, Northern Section, Mr. P. Morrell, A.M.I.E.E. (resident engineer, Dunston power station); Southern Section, Mr. E. Forth, B.Sc., A.M.I.Mech.E. (resident engineer, North Tees power station); *generating engineer, construction*, Mr. H. G. B. Mahon (construction engineer, North-Eastern E.S. Co.); *transmission engineer*, Mr. R. Willoughby, B.Sc., A.M.I.E.E. (assistant transmission engineer, C.E.B., North-Eastern Area); *system operating engineer*, Mr. A. W. Mitchell (chief control engineer, North-Eastern E.S. Co. and C.E.B. joint control); *divisional secretary*, Mr. W. M. Tulip, B.Sc., M.I.Mech.E. (technical assistant to general manager, North-Eastern E.S. Co.); *divisional accountant*, Mr. A. L. MacDonald, A.C.A. (senior accountant, C.E.B., North-Eastern Area).

Yorkshire Division.—*Secretary*, Mr. F. Walkland (C.E.B.); *chief accountant*, Mr. W. N. Wishart (C.E.B.); *chief technical engineer*, Mr. W. T. Atkins (C.E.B.); *chief transmission engineer*, Mr. R. H. Grafton (C.E.B.); *chief engineer, operation*, Mr. P. G. Hieatt (C.E.B.); *chief engineer generation (construction)*, Mr. W. H. Dunkley (deputy chief engineer, Hull Electricity Department); *chief engineer genera-*

tion (*operation*), Mr. C. G. Richards (Sheffield Corporation); *construction engineers, generation*, Mr. I. D. Campbell (Sheffield Corporation), Mr. G. B. Melton (Yorkshire Electric Power Co.) and Mr. F. Barrell (deputy chief engineer, Leeds Electricity Department); *generation engineers, operation*, Mr. D. Macfarlane (Sheffield Corporation), Mr. H. E. Vickers (Hull Corporation) and Mr. H. H. Hobbs (Yorkshire Electric Power Co.).

South-Eastern Division.—*Secretary*, Mr. T. Penman, A.C.I.S. (Llanelly & District Electric Supply Co.); *accountant*, Mr. H. Marriott, C.A. (C.E.B.); *chief generation engineer* (*operation*), Mr. P. Briggs (Fulham); *chief generation engineer* (*construction*), Mr. W. B. Shannon, M.Inst.C.E. (London Power Co.); *transmission engineer*, Mr. C. F. Bolton, A.M.I.E.E. (C.E.B.); *technical engineer*, Mr. H. B. Laine, A.M.I.E.E. (C.E.B.).

Midlands Division :—*Chief generation engineer* (*operation*), Mr. G. P. Sutton, A.M.I.E.E.; *chief generation engineer* (*construction*), Mr. L. F. Jeffrey, B.Sc., M.I.E.E., M.Inst.C.E., M.I.Mech.E.; *transmission engineer*, Mr. H. S. Davidson, M.I.E.E.; *system operation engineer*, Mr. P. W. Cash, A.M.I.E.E.

South-Western Division :—*Generation engineer* (*operation*), Mr. S. M. Hill, A.M.I.E.E., M.I.Mech.E., F.Inst.F.; *transmission engineer*, Mr. S. Hoggart, A.M.I.E.E.; *technical engineer*, Mr. T. S. Andrew, M.I.E.E.

North-Western Division :—*Chief generation engineer* (*operation*), Mr. J. L. Ashworth, A.M.I.E.E., A.M.I.Mech.E.; *chief generation engineer* (*construction*), Mr. C. R. Watson-Smyth, M.Inst.F.; *transmission engineer*, Mr. H. R. Schofield, A.M.I.E.E.; *secretary*, Mr. P. H. Flatt, B.Sc., A.C.I.S.; *accountant*, Mr. H. Tweedale, C.A.; *senior assistant accountant*, Mr. A. McLellan.

South-West Scotland Division :—*Transmission engineer*, Mr. J. A. Aked, A.M.I.E.E.

East Midlands Division :—*Chief generation engineer* (*operation*), Mr. P. Ormiston, A.M.I.E.E., M.Inst.F.; *chief generation engineer* (*construction*), Mr. F. Favell, M.I.E.E., M.I.Mech.E.; *transmission engineer*, Mr. J. D. Ravenscroft; *accountant*, Mr. H. R. Niven, C.A.

Sub-Division of Areas

North Western and East Midlands

PARTICULARS have been received of the division into sub-areas of the following Electricity Areas :—

North Western.—No. 1.—Manchester, Stretford and District, Salford, Sale, Altrincham, Eccles and Cheadle and Gatley. No. 2.—Lancs E.P. Co., Wigan, Bolton, Bury, Heywood, Turton, Hindley, Ashley-in-Makerfield, Leigh, Atherton, Farnworth, Swinton and Pendlebury and Preston (part). No. 3.—Stalybridge, etc., Board, Oldham, Rochdale, Ashton-under-Lyne, Whitworth, Littleborough, Milnrow and Middleton. No. 4.—Lancaster, Preston, Blackpool, Morecambe and Heysham, Thornton Cleveleys, Fleetwood and Lytham St. Annes. No. 5.—Settle and District, Clitheroe, Lancs E.P. Co. (part), Nelson, Colne, Burnley, Blackburn, Accrington, Darwen, Haslingden, Brierfield, Padiham, Rawtenstall and Bacup. No. 6.—Carlisle, Mid-Cumberland, Penrith, Keswick, South Cumberland, Westmorland and District, Windermere and District, Barrow-in-Furness, Ulverston, Cark, Grange, Kendal and Sedbergh.

East Midlands.—No. 1.—Derbyshire and Nottinghamshire (incl. Chesterfield and Mansfield). No. 2.—Lincolnshire (incl. Lincoln, Skegness, Boston and Grantham). No. 3.—Leicestershire and Warwickshire (incl. Warwick and Rugby). No. 4.—Northamptonshire (incl. Kettering and Buckingham). No. 5.—Derby. No. 6.—Nottingham. No. 7.—Leicester. No. 8.—Coventry. No. 9.—Burton and District.

South-East Scotland.—Fife sub-area (Fifeshire); Stirling, Clackmannan and West Lothian sub-area (counties of Clackmannan and West Lothian and part of Stirling and Dumbarton); Edinburgh sub-area ; Lothian sub-area (East Lothian and parts of Midlothian and Peeblesshire); Southern sub-area (counties of Berwick, Selkirk and Roxburgh and part of Peeblesshire.

Central Board's Last Meeting

Twenty-One Year's Work

THE Central Electricity Board held its last monthly meeting on 12th March. On 1st April, the " vesting date " for the nationalization of the electricity supply industry, the functions of the Board will be taken over by the British Electricity Authority, which will assume responsibility for the management and operation of the grid.

Set up in February, 1927, the Board held its first meeting on 3rd March, 1927, under the chairmanship of Sir Andrew Duncan, and has thus been in existence for almost exactly twenty-one years. Two members of the Board, Sir Duncan Watson and Mr. W. K. Whigham, were present at the first and last meetings, each having served continuously throughout the period.

During the lifetime of the Board, the output of electricity for public supply purposes in Great Britain has risen from 7,000 million kWh to over 42,000 million kWh a year, a sixfold increase. The Board's final report will be issued towards the end of the month.

Sheffield Mobile Demonstration Van

The Sheffield Corporation Electricity Committee is to purchase an old single-decker bus for conversion into a travelling theatre for demonstrating electrical appliances in the suburbs of the city.

Industry and the House

Position of Nationalized Services

By F. J. Erroll, M.A., A.M.I.E.E., M.P.

THE political scene during the past fortnight has been clouded by the imminence of the Government's Economic White Paper, and one sensed an air of critical quietness preceding its appearance. Because of this, perhaps, many of the less significant happenings in the House received briefer notice than is usual. For example, the debate following a prayer to annul both the Electricity (Price Control) Order, 1948, and the Electricity Supply (Relaxation of Obligations) Order, 1948, revealed a Governmental paradox deserving more publicity.

Mr. Boyd-Carpenter (Kingston-upon-Thames) who had moved the annulment of the first Order, told the House the intention behind the Order was, as far as the municipalities were concerned, not unreasonable. But there was considerable ground for complaint in its relation to companies. At a time when the Chancellor of the Exchequer was applying measures to freeze prices, the Order under review forbade the electricity companies to *lower* prices. The possibility on sound economic grounds of companies desiring to reduce their charges was a very real one.

Effect on Production Cost

It was peculiarly inappropriate that this limitation should apply to electricity, which was, of course, a substantial element in the cost of production of many industries relying upon electricity. Equally, it constituted a very substantial element in the cost of living.

The Chancellor has himself stated that the Government's objective is to reduce prices wherever possible, and to reduce profits. But nationalized industries are, apparently, to be exempted from this policy. Mr. Robens, the Parliamentary Secretary to the Ministry of Fuel and Power, thought the Opposition's prayer an entirely academic argument. He denied that his Ministry was limiting bulk supply rebates to only 5 per cent, and said that where the discounts were of a reasonable type they would be " agreed to quite easily." Control was being exercised only where municipal corporations were distributing their reserves so as to deliberately reduce the assets which the socialized industry would take over. The Order applied to both municipalities and companies because drafting difficulties between the two types of supplier had made the Order necessary for both.

The consumers' principal interest is centred in the effect of nationalization upon prices, quality and facilities. It is in the public interest, therefore, that the fullest possible information concerned with the working of the State industries should be made available. But this is not being done.

The State management of industry must, of necessity, be embodied in large departments, but it need not be so patently unwieldy as to be beyond the reach of Members' questions. There is growing dissatisfaction at the policy of " passing the buck."

Requisitioning Powers

Mr. Teeling (Brighton) asked the Minister of Works what powers of requisitioning had been delegated to the Electricity Boards by his Ministry, and under what circumstances could the Electricity Board request the Minister of Works to requisition property. In reply Mr. Key said that he had delegated no powers of requisitioning to the Electricity Board. It was open to the British Electricity Authority, through the Ministry of Fuel and Power, to ask the Ministry of Works to help in the provision of accommodation. Mr. Teeling told the Minister that a representative of the Electricity Board has informed Hove Council that the Board had power to requisition. Mr. Key repeated that he, as the Minister of Works, had delegated no powers to the Electricity Boards, but that in exceptional circumstances it might be possible to use Government authority to requisition property for the British Electricity Authority.

Members of all parties have been wondering what the effect of the staggering of working hours has been, and whether the Government had any plans for the future. They were therefore interested in Mr. Gaitskell's reply to Mr. Wyatt, Socialist M.P. for Aston, Birmingham. He said that industry, through the staggering of hours and other means, had made a large contribution toward spreading the demand for electricity. The same methods could not be applied to the non-industrial and domestic load, and this load had remained relatively stable during peak hourss.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Mr. Teeling asked the Minister of Works what powers of requisitioning had been delegated to the Electricity Boards by his Ministry; and under what circumstances could the Electricity Boards request the Minister of Works to requisition property.

Mr. Key said he had delegated no powers of requisitioning to the Boards. It was open to the Central Electricity Authority, through the Ministry of Fuel and Power, to ask his Ministry to help in the provisions of accommodation. It would be for him to decide how he met that request.

Mr. Erroll asked whether the Minister's reply meant that he could use Government authority to requisition property for the British Electricity Authority.

Mr. Key replied that he had not said so, but, in exceptional circumstances, if it were necessary to provide accommodation, it might be possible so to do.

Personnel of Area Boards

Mr. Edward Evans asked the Minister of Fuel and Power how many persons appointed to Electricity Boards had had experience as practical workpeople engaged in the supply industry, with their names and areas.

Mr. Gaitskell said that it would be observed from the list of the members of Area Boards, as now constituted, that nearly all the chairmen and deputy chairmen and a fair proportion of the part-time members had had long practical experience in the electricity supply industry, or in work closely associated with it, and that one or more members of each Board had had experience in the organization of workers, whether in the industry or otherwise. He could not say, without inquiry from each individual member, how many Board members had at one time or another had actual practical experience as workpeople in the industry.

Battersea Power Station Extension

The Minister of Fuel and Power was asked by Mr. Ewart whether he could make a statement about the present position in regard to the proposed application of the London Power Co., Ltd., to the Electricity Commissioners for consent to the further extension of the Battersea power station by the installation of 100,000 kW of generating plant and associated boiler plant.

Mr. Gaitskell said that the Minister of Health, the Minister of Works and the Minister of Town and Country Planning, concurred with him that there was no objection to the proposed further and final extension of the Battersea power station subject to the observance of the same conditions in regard to gas washing as were imposed in connection with previous extensions and he had informed the Electricity Commissioners accordingly.

Sulphur Plant at Meaford

Mr. Hugh Fraser asked the Minister of Fuel and Power whether he would now take steps to require the installation of sulphur cleansing plant at the new power station at Meaford in Staffordshire.

Mr. Gaitskell said he could not, but the consent to the establishment of the Meaford generating station provided that the undertakers should, if so required by the Electricity Commissioners, at any time install plant for the prevention of the discharge of sulphur and its compounds into the atmosphere.

A Scottish Case

Mr. Henderson Stewart asked the Minister of Fuel and Power when he expected to be able to table a draft of the Regulations to be made by him and the Secretary of State for Scotland jointly under Section 55 of the Electricity Act, 1947, having regard to the imminence of the vesting date under the Act.

Mr. Gaitskell said that the preparation of these regulations was proceeding, but in view of the necessity for consultation with the trade unions and associations representing persons who might be affected, he regretted he was at present unable to forecast when the draft regulations would be tabled.

Shortage of Poles

Mr. Digby asked the Minister of Fuel and Power what steps he was taking to make available the poles and other materials required by the Wessex Electricity Co. for the extension of a supply of electricity to Cheselbourne, Dorset, where a supply was urgently needed in the interests of food production.

Mr. Gaitskell said that there was a general shortage of this kind of equipment which the Departments concerned were doing everything they could to overcome. Poles for the Cheselbourne scheme would be made available as and when delivery of the other materials was completed.

Deaf Aids

Mr. John E. Haire asked the Minister of Supply if he was satisfied that the supply of batteries for deaf aids was now sufficient; and whether he would give an assurance that it would be sufficient after 5th July next.

Mr. Jack Jones said that apart from a temporary shortage of one type of battery which should be remedied by the end of the month, supplies were at present adequate and there should be no difficulty in meeting future demands.

COMMERCE and INDUSTRY

Tariffs in Scotland. Electricity Supply Statutes.

THE local authorities' Hydro-Electric General Committee met the North of Scotland Hydro-Electric Board in Edinburgh last week to discuss problems arising out of the 1947 Electricity Act. The Board's representatives explained that a uniform tariff had to be devised and applied to the whole of its extended area. This was urgent because, through the present level of coal prices and costs generally, many undertakings, including some in the Board's area, were running at a substantial loss.

Mr. Thomas Johnston, chairman of the Board, said that the first duty of the Board was to provide supplies of electricity required to meet the demands of ordinary consumers in the area. The second was to supply large power users and the third to supply the grid. Since supplying electricity to meet the demands of ordinary consumers was very uneconomic, the Board had to secure a profit on other supplies because they were a commercial concern and had to make ends meet. Every effort was being made to interest and attract small local industries for the general benefit of the Highlands as a whole. The Board discussed with the Committee questions arising out of the rating provision affecting the hydro-electric undertakings.

Cable Industry Holidays

The Joint Industrial Council for the Electrical Cable Industry has amended the agreement relating to statutory holidays. In England and Wales the holidays are to be Good Friday, Easter Monday, Whit Monday, August Bank Holiday, Christmas Day and Boxing Day (or if Christmas Day or Boxing Day falls on a Saturday or Sunday, such weekday as may be substituted by agreement).

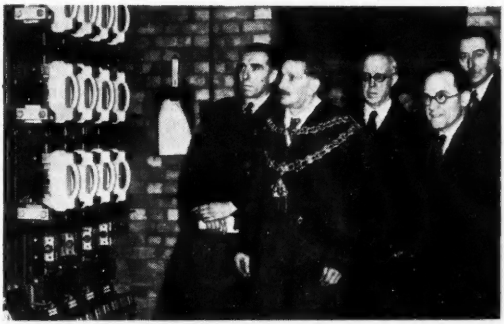
Television Relay Link

Field trials over the route of the London to Birmingham television radio-relay link, which the G.E.C. is designing and supplying to the British Post Office, are now being carried out. Temporary masts have been erected at the sites selected for intermediate stations and propagation tests are being conducted between them.

Two mobile laboratories (motor vans) each equipped with c.w. and pulse transmitters for the appropriate frequency range, together with receivers, display systems and recorders complete the equipment. They also contain signal generators, frequency meters and low and high power r.f. wattmeters, while each unit has its own mobile 240-V a.c. 50 c/s power supply. Contact between the two mobile laboratories is maintained by decimetre-wave communications transmitters and receivers with the portable masts.

Shoreditch's First A.C. Substation

Plans were in hand in 1939 for changing the system of supply at Shoreditch from d.c. to a.c. and since the war attention has again been directed to this matter, the consent of the Electricity Commissioners to the change-over being obtained in April, 1946. In furtherance of this policy it is desirable that wherever possible new buildings erected on the bombed sites in the borough shall be supplied with a.c. To serve a new block of flats on the Stonebridge estate contracts were placed for the erection of the first a.c. substation which was recently formally opened by the Mayor (Ald. F. James, J.P.), although a supply was in fact first made available from this source in February, 1947. The Stonebridge substation (1,000 kVA) transformers supply from 6,600 V to 240 V, single phase, for domestic purposes, and 415 V, three-phase, for power. Equipment is included for the automatic control of street lighting. Plant is on order to equip six other substations in different parts of the borough, specifically in the first place for new housing developments.



Group at switching-on ceremony at Stonebridge substation, Shoreditch

Left to right: Mr. R. H. Rawll, M.I.E.E., M.I.Mech.E. (borough electrical engineer and manager), Ald. James, J.P. (Mayor), Mr. R. C. Ray, O.B.E., B.A. (town clerk), Councillor D. Wray (chairman, Electricity Committee) and Mr. H. Lawson, A.M.I.E.E., A.I.Mech.E. (chief assistant engineer)

Brighouse Jubilee

An electricity supply was first made available in Brighouse as far back as 1892, when certain

premises in the centre of the town were served for lighting purposes by a private company. This month, however, sees the completion of fifty years' working of the municipal undertaking, and to mark the occasion the engineer and manager (Mr. W. H. A. Belliss) has arranged a special display in the showrooms, illustrating the growth of the undertaking and the development of electrical appliances through the years. Last week the chairman and members of the Electricity Committee entertained past chairmen and vice-chairmen of the Committee, Mr. A. Aspinall who was manager of the undertaking from its inception until his retirement in 1946, and many other people who have been closely associated with its growth, as well as representatives of the new Electricity Board which will take over the undertaking on 1st April.

Electrically Welded Tube Prices

A reduction of 2½ per cent in the price of all their electrically-welded tubes, and of all components and products made from them, as from 15th March, was announced last week by Tube Investments, Ltd. The absorption of increased costs, together with the reduction announced are equivalent to a price adjustment of about 7½ per cent, made possible as a result of increasing standards of efficiency in production, it was stated. An examination is being made into the possibility of reducing prices of other ranges of products. Mr. I. A. R. Stedeford, chairman of the company, said that the cuts and those they were contemplating, must depend on there being no further increases in the cost of steel and other variable items in production costs.

Morphy-Richards Blyth Factory

Mr. C. F. Richards, joint managing director of Morphy-Richards, Ltd., has issued a statement to the effect that the company is not to proceed with the lease of a factory at Blyth (Northumberland) under the Government distressed area scheme owing to the inability of the Ministry of Works to issue licences or materials for the manufacture of electric fires, which were to be the main production at that factory. Production of all other appliances continues unhindered at the company's St. Mary Cray works.

Electricity Supply Statutes

Mr. J. W. Simpson, secretary of the Incorporated Municipal Electrical Association, and Mr. C. J. Hornsby, formerly assistant secretary to the Electricity Commission and now holding a similar position with the British Electricity Authority, have produced "The Electricity Supply Statutes as adapted or modified by the Electricity Act, 1947." This begins with a summary of the provisions of the 1947 Act. There follows a list of previous Acts as adapted or modified by the 1947 Act, a reprint of that Act itself, and a list of enactments repealed by the Act. There are separate indexes to the statutes and to the Hydro-Electric Development (Scotland) Act, 1943, as adapted or modified by the 1947 Act. Copies of the book are obtainable from Mr. Simpson at Kingsway House (5th floor), Kingsway, W.C.2, at 20s., including postage.

Diesel Plant for New Zealand

On behalf of the New Zealand Public Works Department, Clyde Engineering, Ltd., Wellington, have ordered five 400-kW diesel driven generating sets from Associated British Oil Engines, Ltd. Initially four of the sets will be installed at Stoke, near Nelson, to constitute a power station extension until the hydro-electric extensions are completed, when the sets will be moved to provide additional power where it is needed.

Home and Export Exhibition

Originally arranged for this month, the Engineering and Industrial Equipment (Home and Export) Exhibition will now be held at the Royal Horticultural Hall, Vincent Square, Westminster, London, S.W, from 19th to 28th May.

Radio Telephone Equipment for Ceylon

The General Electric Co., Ltd., has recently completed an order for equipment for the Ceylon Police Force comprising eight mobile transmitter-receiver units for police cars and one 100-W f.m., v.h.f. fixed station transmitter-receiver with remote control gear. The "Simplex" method of operation is provided.

Tube Investments Acquisition

Tube Investments announces the acquisition of Crane Packing, Ltd., of Slough, Bucks, a company which specializes in the manufacture of heat exchanger tube packings, flexible and semi-metallic packings, insoluble lubricants, plastic lead jointing seals, flexible extractors, and tools for condenser packings. Plans are in preparation to extend output capacity.

Reports on German Industry

The following reports on German industry are now available from H.M. Stationery Office:—F.I.A.T. T/8 T-10. "The Michell-Ossberger Turbine" (2d.); F.I.A.T. T/B T-20. "Electroplating with Copper, Zinc and Silver (Siemens & Halske A.G., Berlin)" (2d.); F.I.A.T. T/B T-30. "Compact High Efficiency Alternating Current Rectifier" (2d.); B.I.O.S. 1566. "The Manufacture of Condensers, High Voltage Bushing Insulators and Laminated Electrical Insulation at 'Dielektra' A.G. Porz-am-Rhein." (2s.); F.I.A.T. T/B T-47. "Electrical Grades of German Plastics" (2d.); C.I.O.S. XXXIII-12. "German Arc Welding

Electrodes and Their Manufacture" (12s.); B.I.O.S. 1620. "German Alkaline Accumulator Industry and Miners' Lamps using Alkaline Accumulators" (4s. 6d.); B.I.O.S. 1671. "Electron Microscopy in Germany" (5s.).

Generation in February

Official returns to the Electricity Commissioners show that 4,227 million kWh was generated (3,996 million kWh sent out) by authorized undertakings in Great Britain during February. This compares with the revised figure of 3,681 million kWh generated (3,475 million kWh sent out) in the corresponding month of 1947, an increase of 546 million kWh or 14·8 per cent, but the comparison is of course affected by the compulsory fuel cuts during the crisis period last year.

During the first two months of 1948 the total number of kWh generated was 8,768 million (8,291 million sent out), compared with the revised figure of 8,351 million (7,898 million sent out) for the corresponding period of 1947, an increase of 417 million or 5 per cent.

South African Motors for Venezuela

The *South African Mining and Engineering Journal* reports that the First Electric Corporation of South Africa has obtained an order from the Shell Company of South Africa, on behalf of its parent organization in England, for electric motors totalling about 12,000 h.p. for use in its Venezuelan oil fields. This order follows the export by the First Electric Corporation of 22,000 kVA of generating plant to Great Britain.

National Coal Board Moves

The headquarters of the National Coal Board have been moved from Lansdowne House, Berkeley Square, W.1, to permanent premises at Hobart House, Grosvenor Place, Victoria, S.W.1. (Telephone: Victoria 6644; telegrams: "Telex, London.") The Manpower and Welfare Department of the Board, will remain at Lansdowne House until the middle of May.

Radio-Frequency Baking

Representatives of the baking industry attended a lecture-demonstration on the experimental baking of bread by the radio-frequency heating method which was delivered in London last week by Mr. L. D. Price (G.E.C.) in conjunction with the Unilever Bakery Service. Mr. Price explained the nature of R.F. heating and how its application differed from existing methods in the baking industry. A description was given of results obtained in the laboratory, illustrated by demonstrations with a 5-kW R.F. generator. From the technical aspect the baking of bread and cake and the melting of chocolate couverture showed some promise, but other applications had not yet been successful.

The lecturer stressed the fact that there was some divergence between a successful laboratory experiment and a practical commercial installation. Emphasizing the need for careful consideration of the economic factor he said that owing to the lack of experience in R.F. baking on any scale it was not at the moment possible to make an accurate analysis. Rough calculations, however, indicated that the cost of R.F. equipment was such as to cause doubt whether it would become a commercial proposition. Even assuming all technical difficulties were overcome, there was no indication that R.F. baking was, so to speak, "just around the corner." On the other hand some processes, such as the thawing of frozen egg, in which case the power requirements would be relatively small, the use of radio frequency heating might prove attractive.

Killed While Experimenting

At an inquest at West Bromwich on Gordon Ernest Moore (aged 16), it was stated that he received a fatal shock at home while operating from the mains a transformer which he had tried to adapt. He was employed in the Corporation Electricity Department and was described as a clever boy, fond of making models and very careful with electricity. The apparatus with which he was experimenting was not suitable to be connected to the mains by the means employed, said Mr.G. O. Edwards, borough electrical engineer. He believed the transformer was discarded Government equipment, probably used in aircraft or for ground radar purposes and was obviously intended to be operated from batteries at 27 V. The boy tried to adapt it for use with an electric motor. The deputy coroner recorded a verdict of "Accidental death."

Steam Generation

A brochure of 75 pages, handsomely produced in colours by International Combustion, Ltd., illustrates the range of boiler plant installed in large electricity generating stations, and smaller types in industrial works at home and abroad. It includes tabulated data on, with sectional drawings of, plant installed; typical examples of availability (outage days per annum) and information on methods of firing with pulverized fuel, coal grinding mills, grit disposal, with a comparison of efficiencies of p.f. and stoker-fired boilers.

Rubber Production and Consumption

Production of natural rubber last year is estimated at 1,230,000 tons, according to the *Rubber Statistical Bulletin* (W. H. Smith & Son, 2s.). This compares with 837,500 tons in the preceding year. Consumption increased from 555,000 to 1,082,500 tons, that of the United Kingdom rising from 96,647 to 153,400 tons and of the United States from 277,597 to 562,698 tons.

On the other hand synthetic rubber production

declined from 806,564 to 559,324 tons and consumption from 912,500 to 630,000 tons. Consumption of synthetic rubber in the United Kingdom last year amounted to only 2,773 tons, against 30,123 tons in 1946.

An analysis of the main rubber products shows that the British cable-making industry consumed 11,657 tons of rubber, of which 988 tons was synthetic. Stocks of natural and synthetic rubber in the U.K. at the end of 1947 aggregated 129,186 tons (2,026 tons synthetic) compared with 184,445 tons (3,421 tons synthetic) at the beginning of the year.

German Lamp Exports

The production of the glass bulbs for electric lamps in the British zone of Germany has now reached sufficient proportions to permit of substantial exports after domestic requirements have been met, according to the Industrial Division of the British Control Commission. The Osram Works in the British sector of Berlin produced up to the end of last year over 20 million bulbs and 300,000 have already been delivered to Switzerland under a contract calling for a total of one million.

Trade Announcements

As from 1st April sales of Clix radio and television components manufactured and hitherto marketed by British Mechanical Productions, Ltd., will be handled by the company's wholly owned subsidiary, **General Accessories Co., Ltd.**, of 21, Bruton Street, London, W.1.

C. H. Blackburn & Co., Ltd., inform us that Holland House Electrical Co., Ltd., of 217, St. Vincent Street, Glasgow, C.2 (and Branches), have been appointed sole distributors in Scotland for "Stellex" immersion heaters and other "Stellex" products.

British Electronic Products (1948), Ltd.—The development, engineering and certain production facilities of the company have been transferred to new premises at Brereton Road, Rugeley, Staffs (telephone: Rugeley 130.)

S. O. Bowker, Ltd., has appointed Mr. H. Harding as senior representative for London and the Home Counties. His address is Flat 3, 60 Hogarth Road, Earls Court, London, S.W.5.

Trade Publications

H. Frost & Co., Ltd., Walsall.—Descriptive leaflet and price list of stationary and oscillating desk fans.

George Cohen Sons & Co., Ltd., Sunbeam Road, London, N.W.10.—Leaflet illustrating electrically-driven metalclad circular saw benches.

Supra-lux Ltd., Rodney Place, London, S.W.19.—Priced leaflet on 15, 25 and 40 W fluorescent lamps and fittings for domestic and industrial use.

J. E. Sexton & Co., Ltd., 162–164, Gray's Inn Road, London, W.C.1. — Priced leaflet on a flexible-arm desk lamp.

Le Carbone Ltd., Battery Works, Portslade, Sussex.—Catalogue of carbon brushes for electrical machines.

Telegraph Construction & Maintenance Co., Ltd., Telcon Works, Greenwich, S.E.10.—Catalogue of mumetal, radiometal and rhometal laminations for chokes and transformers.

Woods of Colchester, Ltd., Colchester, Essex.—Three priced catalogues and two leaflets; (PF 47) on 24–72 in. (61-183 cm) industrial propeller fans, (FPF47) 12–36 in. (30-91 cm) flameproof propeller fans, (AF47) 6–48 in. (15-122 cm) axial flow fans. Sheet R1 describing roof input units and AR1 a.c. fan speed regulators.

Electrocraft Equipment, Foundry Lane, Birmingham, 40.—Three leaflets and price list of fluorescent lighting fittings.

Trade Marks

APPLICATION has been made for the registration of the following trade marks. Objections may be entered within one month from 10th March:—

SMITHS (various designs). Nos. 634,198, 654,806, 654,824 and 654,826. Class 9. Revolution indicators, altimeters and other instruments; electric accumulators, electric batteries; switches for fuel control gauges; telegraph instruments and apparatus, etc. Nos. 654,812, 654,822 and 654,825. Class 14. Horological instruments.—S. Smith & Sons (England), Ltd., Cricklewood Works, Edgware Road, N.W.2.

ELLIOTT (design). No. 643,331. Class 9. Electrical and mechanical measuring, testing, indicating, recording and control instruments, etc.—Elliott Bros. (London), Ltd., 72, Victoria Street, S.W.1.

METROLOCK. No. 650,978. Class 9. Controlling and regulating apparatus included in Class 9 for machinery and tachometers.—Metropolitan-Vickers Electrical Co., Ltd., 1, Kingsway, W.C.2.

OAK PRODUCTS (design). No. B653,444. Class 9. Vibrators and switches, all being component parts of radio sets.—Oak Mfg. Co., Chicago. Address for service c/o A. A. Thornton & Co., Napier House, 24-27, High Holborn, W.C.1.

WINDAK. No. 655,320. Class 9. Electrically heated clothing and foot muffs.—Baxter, Woodhouse & Taylor, Ltd., Queen's Buildings, St. Peter's Square, Stockport.

WIREK (design). No. 655,455. Class 9. Electrical sound-recording and sound-reproducing instruments.—Boosey & Hawkes, Ltd., 295, Regent Street, W.1.

POTENTIOTROL. No. 656,344. Class 9. Instruments and apparatus for measuring, recording and controlling temperatures.—Ether, Ltd., Tyburn Road, Erdington, Birmingham, 24.

IGLOO. No. 656,521, Class 11. Refrigerators.—Igloo, Ltd., 84, Topping Street, Blackpool.

Supply Area Tariffs

An Analysis of One Area

By G. O. McLean

These notes were written when the author was in charge of tariffs for the Edmundsons group. As recently reported, he has now been appointed chief engineer to the South Western Electricity Board

THOUGH it may seem premature for a discussion on the type and price level of supply-area tariffs to be initiated so soon after the setting up of Area Boards, nevertheless the public will judge the success or failure of the new organizations by the effect on their pockets and the speed with which nationalization discloses itself as rationalization with beneficial results.

While the independent authorities are at present working smoothly from the engineering and financial points of view, and despite the amount of work involved in setting up the new system, it behoves each Area to examine the finances of each of its constituents (many incurred losses last year) and decide on a broad plan for tariff making.

One of the main difficulties in the way of accurate planning at this stage is the rescinding of the 1926 Act and hence lack of knowledge with regard to the bulk price of energy which the Central Authority will charge to the Area Boards. A reasonable assumption on this point would be that the total cost of energy to an Area would not be very different from the sum of the costs charged to the individual constituents by the Central Electricity Board in the immediate past.

As a statistical exercise, the author has analysed the costs and existing tariffs of the thirty-eight constituents of the Eastern Region. This was chosen because of familiarity with the terrain and because 60 per cent of the geographical area is controlled by companies supplying approximately 10 per cent of the Area load in the group with which the author is associated and for which data has been collected and tabulated over a number of years.

Because this analysis was a bit of private homework, the latest published statistics were used (Electricity Commissioners' Return, Vol. XVI—published in 1946 but covering the year 1943-44), and no attempt was made to get the latest detailed accounts from each of the constituent authorities, which would have facilitated cost allocations and the assessment of fixed and running charges as recommended by E.R.A. Report K/T. 112. Despite these self-imposed drawbacks and some assumptions where consolidated results have had to be split, it was felt the results of the analysis were worth recording, first, to demonstrate the narrowness of the ranges of average prices resulting from the alleged chaos of multiplicity of tariffs and, secondly, to calculate a simple single tariff applicable to the whole area, if such a course were desirable and bearing in mind that the tariff should be capable of easy modification.

To facilitate the work the authorities were placed in groups corresponding to recorded maximum demands (steps of 10 MW). Records were extracted from the Commissioners' Returns relating to distribution area; population; number of consumers; total kWh sold; lighting, heating and cooking

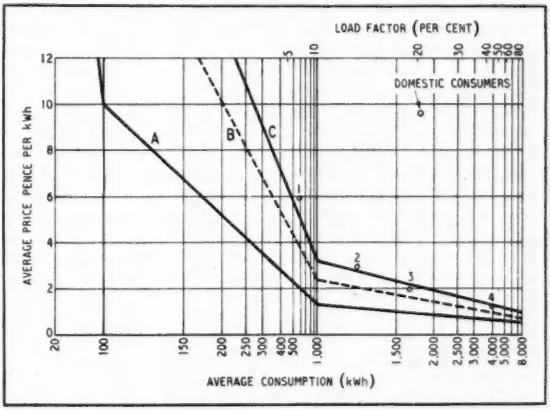


Fig. 1.—Average price per kWh paid by domestic consumers related to annual consumption per kW of demand and load factor

kWh sold; distribution capital; working expenses; and gross revenue. When the group expenditure is from £26 to £71 per consumer.

TABLE 1. PRICE—POPULATION CONTINGENCY

Price	8d.	7d.	6d.	5d.	4d.	3½d.	3d.	2½d.	2d.	1½d.	1¼d.	1d.	¾d.	Block Tariff Price
Percentage of population														
All on lighting flat rate ..	1	40	27	21	11	—	—	—	—	—	—	—	—	6d
All occupying house—800 sq. ft, 5 rooms, £18 r.v., using 200 kWh p.a.	—	1	7	34	56	2	—	—	—	—	—	—	—	4·2d.
Using 800 kWh p.a.	—	—	—	—	—	—	1	2	51	—	46	—	—	1·8d.
Using 2,400 kWh p.a. ..	—	—	—	—	—	—	—	—	—	1	18	31	42	8	1·1d.
Using 4,800 kWh p.a. ..	—	—	—	—	—	—	—	—	—	1	2	41	16	40	0·85d.
All occupying house—1,200 sq ft, 6 rooms, £24 r.v., using 200 kWh p.a.	2	3	32	40	23	—	—	—	—	—	—	—	—	—	5·8d.
Using 800 kWh p.a.	—	—	—	—	—	1	1	24	44	—	30	—	—	—	2·20d.
Using 2,400 kWh p.a. ..	—	—	—	—	—	—	—	—	1	1	42	18	34	4	1·35d.
Using 4,800 kWh p.a. ..	—	—	—	—	—	—	—	—	—	1	3	45	19	32	0·976d.
All occupying house—2,000 sq ft, 8 rooms, £40 r.v., using 200 kWh p.a.*	26	34	7	3	—	—	—	—	—	—	—	—	—	—	6d.
Using 800 kWh p.a.	—	—	—	—	2	1	30	40	27	—	—	—	—	—	3d.
Using 2,400 kWh p.a. ..	—	—	—	—	—	—	—	—	1	27	23	41	8	—	1·66d.
Using 4,800 kWh p.a. ..	—	—	—	—	—	—	—	—	—	1	19	31	41	8	1·22d.

* Of the remainder, 5 per cent would pay 10d. and 25 per cent 9d. per kWh.

figures were totalled, the following points were apparent:—

(1) More than half the authorities are in the lowest group (0·10 MW) and they contributed only 6 per cent of load, capital, etc., while there are four large authorities, each with over 50 MW load, responsible for more than half the total capital, revenue, expenditure, etc., of the whole area. Significantly, they have a population density exceeding two per acre, while the average for the whole Board Area is 0·7 per acre.

(2) Because of low population density the distribution capital already expended is as high as £58 per consumer or £70 per kW of demand; the range of capital

(3) Whereas the average demand per consumer over the whole area is 0·83 kW, there is a very close correlation between the demand and the ratio of power to domestic kWh (Commissioners' lighting, heating and cooking). The actual range of demands is from 0·55 to 1·35 kW, the lower figure being related to authorities with almost wholly domestic load.

(4) The revenue per domestic consumer is very nearly the same whatever the size of undertaking, the variation being between £5·5 and £6·8.

(5) The ratio between total working expenses and total revenue is also independent of size of undertaking, and averages 74 per cent, or, in other words,

TABLE 2—FREQUENCY DISTRIBUTIONS OF HOUSE SIZES AND CONSUMPTIONS

Floor area, sq ft ..	Below 800	−1000	−1200	−1400	−1600	−1800	−2000	−3000	Remarks
Cumulated frequency per cent	36	58	74	83	89	92	95	97	Mean = 1,140 sq ft
Annual consumption kWh (domestic two-part tariff)	Below 200	−400	−600	−800	−1000	−1500	−2000	−5000	
Cumulated frequency per cent	39	54	74	78	81	87	92	99	Mean = 630 kWh About 90 per cent of consumers in group
Annual consumption kWh (lighting flat rate)	Below 100	−200	−300	−400	−600	−800	−1000		
Cumulated frequency per cent	48	84	88	91	93	97	100		Mean = 166 kWh About 10 per cent of consumers

the present tariff builder should aim at a revenue equivalent to 135 per cent of total working expenses to allow for depreciation, interest and losses. (Due allowance would have to be made for increased costs since 1943.)

A further step was to examine existing domestic tariffs for all undertakings to see how the average consumer has been treated in the past. The main difficulty in such an examination is to decide what is an "average consumer" and which tariff of the various alternatives offered by each undertaking he would have selected. It was decided that a clear picture could be obtained if average price for various sized premises and various annual consumptions were plotted against the population to whom the tariffs were on offer. The sizes of houses selected were 800, 1,200 and 2,000 sq ft external floor area, corresponding roughly to 5-, 6- and 8-roomed houses with rateable values of £18, £24 and £40. The annual consumptions selected were 200, 800, 2,400 and 4,800 kWh. The results for each size of house are shown in the Contingency Table, which gives the percentages of the total population of the Board's Area which would pay the price heading the column if they all occupied the size of house indicated and used the number of kWh shown.

Earlier research work has shown that in a typical rural area the distributions of house sizes and annual consumptions are those given in Table 2. The Contingency Table shows that the range of average prices is very narrow, in fact, for over 80 per cent of the population the range does not exceed 2d for the low consumptions and lighting flat rate, and is as narrow as ½d for the higher consumptions. It follows then that a single tariff for the whole Area would cause least inconvenience if it approximated to the modal price values apparent from the Table. If the distributions shown in Table 2 were representative of the whole Area (this is probable and could be checked by a sample survey) then a very close approximation could be made to the number affected and the extent to which change would result. It also follows that since the individual changes would be very small the aggregate revenue would be almost the same as the total revenue obtained by all the constituent authorities. Any single tariff must, of course, conform closely to the costs of the whole Area and supply costs are characterized by having a high fixed portion, which is generally related to demand, and a smaller variable portion due principally to fuel costs and therefore most simply expressed as pence per kWh sold.

As already indicated, the energy cost or the price to be paid by the Area Board to the Central Authority would probably not be very different from the sum of the amounts already paid by the individual authorities to the Central Electricity Board. Expressed in the standard two-part form, this can be taken as £4 per kW of demand plus 0·4d per kWh. The additional costs for distribution, repairs, maintenance, insurance, management, transport and account collecting are mainly fixed charges. Though some are consumer-related and not demand-related, the total costs can conveniently be shown in standard two-part form in Fig. 1 as £8 per kW of demand plus 0·5d per kWh.

Transmission and distribution losses have to be allowed for, together with interest on the outstanding capital and depreciation on all equipment. As indicated earlier, the total revenue in the past has been 33 per cent higher than total costs and a similar margin can be assumed to be a safe one on which to base a hypothetical tariff. A third line has therefore been added to the graph, from which average price per kWh can be read off against annual consumption per kW of demand or load factor.

Coming now to the tariff itself, the fundamentals to be considered in its construction were outlined in the Commissioners' Tariff Committee Reports in 1925 and 1930 and accepted as correct by all engineers who have published papers or articles on the subject. They are that the tariff should be simple, applicable to any consumer, equitable to both consumer and authority, involve the smallest expenditure on meter and wiring, easily understood with the secondary charge as low as practicable. The type of tariff which conforms to these requirements most closely is the variable block tariff recommended by the I.E.E. Post-War Planning Committee in its 1944 Report. The basis of the size of block should, in the author's opinion, be the size of house, and, following the recommendations of the Commissioners' 1930 Committee and the I.E.E. 1944 Report, the unit for assessment could very well be 200 sq ft of floor area with a minimum of 800 sq ft.

The next features for determination are the kWh rates for the blocks. The contingency table and the graph of costs clearly indicate that the primary rate should be 6d per kWh

and the ultimate or incremental rate 0·6d. (Note that coal costs, which affect the kWh charge, have increased considerably since 1944.) The variable block tariff replaces both the lighting (and other) flat rate(s) and also the usual two-part tariff. The lighting consumer gives the supply authority an after-diversity load factor of about 6 per cent, and therefore point 1 can be shown on the graph.

Finally, the number of kWh in each block has to be chosen so that the average prices for different sized houses and different consumptions correspond with the modal value of the Contingency Table and also line up with the revenue line in the figure. It is suggested that 8 kWh per quarter for each 200 sq ft of floor area at the primary rate, followed by ten times this amount at a secondary rate of 1d, with all excess consumption at the ultimate rate of 0·6d per kWh fulfils these conditions. Thus, if a consumer in a 1,000 sq ft house used 200 kWh per annum, he would pay an average price of 5d; if he consumed 800 kWh he would pay an average price of 2d; for 2,400 kWh he would pay 1·2d and for 4,800 kWh 0·9d. These average prices cannot be shown directly on the chart without making certain assumptions regarding after-diversity demand of each class of consumer, or, alternatively, the load factor for each group. For a consumption of 400 kWh the demand is assumed to be 0·33 kW, and therefore the average price of 3d is plotted against 1,200 kWh (point 2). Similarly, points 3 and 4 represent consumptions of 800 and 2,400 kWh per consumer with demands of 0·5 and 0·6 kW.

Space does not permit a discussion of the minor disadvantages of the variable block tariff, such as the prepayment meter question referred to in the I.E.E. Report, but in the author's view the advantages far outweigh the disadvantages, and a short trial in one Sub-Area (or part of one) as soon after Vesting Date as possible should determine this important question for the whole industry.

Prices and Profits

RECOMMENDATIONS for obtaining a reduction in prices in pursuance of the policy outlined in the White Paper on Personal Incomes are contained in a report submitted to the Chancellor of the Exchequer last week by the Federation of British Industries, the Association of British Chambers of Commerce and the National Union of Manufacturers. The organizations point out that they have no power to pledge the agreement of individual members, but are confident that the recommendations will be comprehensively supported. It is considered that action should be taken immediately and remain operative for a year. The main points of the conclusions reached and recommended for voluntary action are as follows:—

The key to reduction of costs and prices is increased productivity and a determined drive to secure maximum productivity from the plant available is recommended. Because of shortages of components and materials, restrictions on capital expenditure and shorter working hours, which prevent full productivity, it is not immediately possible in many industries for price reductions to be made. All concerned are urged to review the situation afresh so that everything that can be done in the way of price reduction should be announced as soon as possible—in the case of price controlled goods as well as others—and the consequence faced of reduced profits. Manufacturers should place a ceiling on selling prices at the levels ruling to-day without any reduction in quality, subject to discretion in exceptional cases. As costs of all goods are dependent upon the prices of basic commodities and services, including fuel, transport and local rates, industry looks to the Government and the responsible authorities and boards to take action on the lines recommended for private industry.

As to the stabilization of dividends, it is recommended that, subject to discretion in exceptional cases, the gross amount distributed by a business in the current year should not exceed the gross amount distributed on the same capital in its last financial year.

As a result of representations by the F.B.I. and the other organizations concerned, the President of the Board of Trade has postponed the date of operation of the six "price-freezing" Orders from 15th March to 26th April.

A memorandum presented to the Chancellor by the National Joint Standing Committee on Wholesale Distribution (upon which the Electrical Wholesalers' Federation is represented) points out that wholesalers have a limited control of their cost prices and gross margins are all rigidly controlled. Residual margins of net profit are so small in relation to the consumers' price that any contribution which wholesalers can make to a substantial reduction in price is negligible. Their operating expenses are likely to increase and the volume of trade will fall with severer rationing and this would react seriously on expense ratios and net profits. Also it is generally felt that purchase tax is on too high a level.

Extensions at Bedford

Inauguration of Additional Grid Connection

CONSIDERABLE benefits have been secured by raising from 6·6 to 11 kV the major portion of the network serving the distribution area of the Bedford Corporation, which includes what was formerly termed the Electricity Commissioners' " rural demonstration " area. When that two-year conversion was described (*Electrical Review*, 4th May, 1945, p. 632) its final completion awaited the provision of a 33-kV connection to the grid network, representing the first stage of a (future) transmission system to augment the existing 11-kV distributors. The original intake was stepped down to 6·6 kV from the grid. The present load on the undertaking is 32,000 kW, the local generating station capacity being 23,000 kW. The energy sold exceeds 98 million kWh yearly.

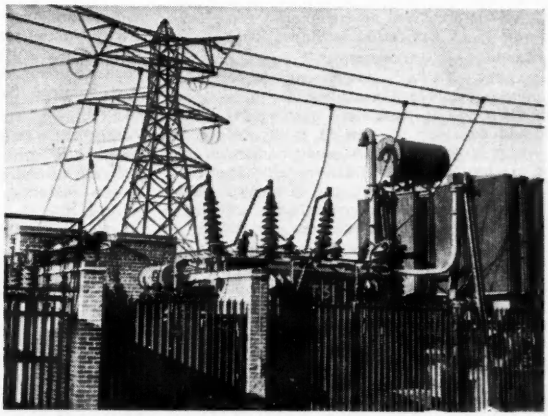
Mr. P. G. Campling, chief engineer and manager, estimates the cost of the new substation at £139,986; it was officially inspected last week by the borough aldermen, councillors and their guests.

Reception is by a double circuit overhead line, glass insulators and steel pylons, one circuit being now in service. It is connected through air-break isolators to one 132/33-kV English Electric transformer of 30,000 kVA with oil cooling radiators and air blowers alongside as well as a 500-kVA combined earthing and auxiliary transformer. Delivery of the second main transformer is expected shortly and there is room for three 60,000-kVA transformers with ancillary gear on the seven-acre site, formerly the Austin Canons estate at Kempston.

The 33-kV Reyrolle switchgear, each circuit breaker being rated at 750 MVA, is contained in three rear compartments and segregated by self-closing fire-proof doors. The building has been equipped by Walter Kidde & Co., Ltd., with automatic " Lux " CO_2 gas fire extinguishing apparatus: busbar-zone protection gear will be delivered shortly.

The substation operates under A.T.M. supervisory control from the distant generating station. The Chloride batteries, 10 V for the supervisory gear and 110 V for the relays, are housed separately next to a small room containing the Westinghouse " Westalite " rectifier charging panel; together with the Ferranti metering panel for the C.E.B., which has not yet been completed. Meanwhile a kWh-meter operates a summator and printometer at the distant power station.

The laying of three 0·25-sq in. (1·61-sq cm) 33-kV Siemens cables with associated pilot, control and telephone cables between the switching susbstation and the power house was carried out by direct labour. They are laid on the bed of the river, crossing from south to north; thence under the permanent way of the Bedford-Hitchin railway line, terminating on three 15,000-kVA, 33/11-kV transformers in brick enclosures at the power station boundary and fitted with tap-changing mechanisms which are actuated electrically from the new control room, cream walls with light blue control board and furniture. The supervisory panels, partly completed, are at the centre of the curved board with operating and indicating panels for switchgear on either side.



Main transformer and air cooler at Austin Canons switching substation

The new building, completed two months ago and inter-communicating with the main office building, has been erected in place of a demolished portion of the original power house.

Transfer of feeders from the power station switchboard to the Reyrolle circuit breakers in the new switch house, which is now proceeding, will complete a seven-years' conversion scheme to bring into unison independent 11-kV systems and enable the 6·6/11-kV step-up transformers originally serving the rural system to be dispensed with. Sections of the three-wire single-phase system have also been changed over to three phase, including the conversion of 3,100 consumers' installations from 105 to 240 V.

ELECTRICITY SUPPLY

Power Station Extensions. Grit Emission at Fulham.

Barrow-in-Furness.—NEW POWER STATION.—The Electricity Committee has authorized the chairman and vice-chairman, the town clerk, the borough surveyor and the borough electrical engineer to meet representatives of the Electrical Commission who are visiting Barrow-in-Furness to inspect the proposed new site of the new power station at the south-east corner of Cavendish Dock. Originally a site near the Vulcan estate was suggested by the Corporation.

Cardiff.—SUBSTATION.—The Electricity Committee has approved an estimate of £64,850 for a new 33-kV substation at Sloper Road.

Carlisle. — " INCONSISTENT " TO INCREASE CHARGES.—To a Government request that undertakings which are likely to incur losses in their trading accounts for the current year should consider revision of tariffs before the vesting date so that they might be handed over as paying concerns, Carlisle City Electricity Committee states that a rise in charges is not consistent with the Government's efforts to control prices, and sees no reason for making an increase.

Consett.—ELECTRICITY TO REPLACE GAS.—The Urban District Council has approved in principle the introduction of electric street lighting in place of gas throughout the area.

Dewsbury.—HIGH-VOLTAGE EXTENSIONS.—Regarding the Council's application for sanction to borrow £17,798 in respect of a scheme for h.v. system extensions, the new authority has requested that orders for materials should be placed as soon as possible.

Eccles.—ESTATE LIGHTING.—The Electricity Committee proposes to provide street lighting on the Ellesmere Park housing estate at an estimated cost of £9,872.

Fulham. — POWER STATION EMISSION. — A town's meeting is to be held as a result of Sir Stafford Cripps' recent rejection, on the grounds of steel shortage, of the Borough Council's application for a loan to buy a grit arresting plant for the power station.

Islington.—POWER STATION ROOF REPAIRS.—The Council has approved an estimate of £15,744 for repairs to the roof of the generating station at Eden Grove. It was damaged on several occasions during the war, and temporary repairs were carried out.

Newcastle-on-Tyne.—REWIRING OF HOSPITAL.—Tenders are being invited by the City Council for the renewal of mains at the City Hospital for Infectious Diseases.

Rochdale.—LOANS.—The Electricity Committee is to apply to the Electricity Commissioners for sanction to borrow £20,000 for the purchase of electric cookers and apparatus and £22,500 for meters and for laying mains and services.

St. Pancras.—RATE AID.—The Finance Committee recommends that the electricity undertaking shall contribute £7,212 to rate relief, equivalent to 1½ per cent of the outstanding debt of the undertaking.

Sandiacre.—ELECTRIC STREET LIGHTING.—The Council has decided to change over from gas to electricity for street lighting.

Scarborough.—PRICE REDUCTION.—The Electricity Committee has recommended a reduction of 1½d. per kWh in the lighting flat rate. A reduction was contemplated last autumn but was deferred because of the increased price of coal.

Sheffield.—PRICE INCREASE RECOMMENDATIONS WITHDRAWN.—Shortly before the meeting of the City Council last week it was stated that the proposed scale of increased charges for electricity had been withdrawn by the Electricity Committee.

Sunderland.—SUPPLY TO TRADING ESTATES.—The Town Council has applied for sanction to borrow £5,070 for supplying electricity to part of the Pallion trading estate. A new substation is to be built by North-Eastern Trading Estates, Ltd.

Woolwich.—POWER STATION EXTENSIONS.—The Central Electricity Board has authorized extensions to the Woolwich generating station by the installation of one 30,000-kW turbo-generator set with two 190,000 lb per hr boiler units.

E.I.B.A. Home

LAST week the first residents arrived at Broome Park, the home—or perhaps it should be called the residential club—for old people which is being established by the Electrical Industries Benevolent Association. The mansion and estate was given by Dr. and Mrs. Joseph Cunning, who are in no way connected with the electrical industry, in appreciation of the Association's progressive approach to the problem of providing happy surroundings for old people, and in memory of their son James Erskine Cunning who was killed on active service during the war.

A number of gifts already promised for the home will shortly be publicly acknowledged, but in the meantime as the home is yet by no means completely furnished. Offers of a piano—there is room for a grand—furniture, carpets, etc., would be welcomed by the secretary, Mr. H. Senior Fothergill, at 32, Old Burlington Street, London, W.1.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The **London Electric Supply Corporation, Ltd.,** reports a total revenue for the year ended 31st December last of £1,442,860, as compared with £1,417,433 for the preceding year. The cost of the purchase of energy totalled £1,129,493 (against £1,080,451), and after meeting other charges there is a net profit of £80,681 (against £130,193), plus interest from investments, etc., £23,362. The ordinary dividend for the year is again 6 per cent, and £79,493 is carried forward (against £70,849 brought in).

The **County of London Electric Supply Co., Ltd.**—At the annual meeting on Tuesday last Sir Robert Renwick (chairman), after referring to the fact that it was their last meeting, said that they were passing over a virile undertaking, together with some £5,000,000 of liquid assets. If all restrictions were removed they estimated that the output of the company would within twelve months go up by 200 million kWh. It had been said that electricity prices throughout the country must soon be raised, but in their undertaking it was premature to talk of raising charges to domestic consumers. He assessed the volume of assets in the group at round about £50 millions, for which they were receiving just over £37 millions.

The **North Wales Power Co.,** reports a net operating profit for 1947 of £235,514, as compared with £287,297 for 1946, plus interest, etc., of £90,368. After providing for directors' fees, debenture interest, depreciation, tax, and other charges there is a balance of £159,644 (against £137,603). The dividend for the year is 5½ per cent (unchanged) and £99,144 is carried forward (against £77,102 brought in).

Mather & Platt, Ltd., report a trading profit for 1947 of £542,905, as compared with £304,740 for the previous year, and after meeting various charges and adding £88,401 brought in, a sum of £283,270 is available (against £236,902). As already announced, the final dividend is 7 per cent, making 11 per cent for the year (same), and £84,769 is carried forward.

The **London Power Co., Ltd.,** reports revenue from the sales of electricity of £7,823,845 for 1947, as compared with £7,050,610 for 1946, which with other receipts makes a total of £7,872,933 (against £7,093,968). The fixed dividend of 6 per cent is paid on the 50,000 shares of £1 each. The output to constituent companies totalled 1,812·54 million kWh (against 1,802·08 million kWh), and to the C.E.B. 1,176·83 million kWh (against 984·82 million kWh), making a total output of 2,989·38 million kWh (against 2,786·90 kWh). The kW demand reached 720,280 (against 686,400).

Speaking at the annual general meeting on 12th March, Major H. Richardson, chairman, said that some progress had been made at the makers' works on the plant for the 66,000-kW extension at Battersea "B" station, but owing to additional delay which had occurred it would not now be possible to complete this work before 1951. The installation at Deptford East station of two 180,000–225,000 lbs/hr boiler units was progressing and the consent of the Electricity Commissioners was now awaited for the first section of the reconstruction of this station by the installation of two 52,500-kW turbo-alternator sets and for 250,000 lb/hr boiler units. Some progress had been made in connection with the new distributing station at North Hyde for the Metropolitan Electric Supply Co., but work had been retarded by shortage of labour and materials. The additional 22-kV interconnection between the Battersea power station and the Horseferry Road distributing station of the Central London Electricity, Ltd., was substantially completed during the year. The bulk supply to Bethnal Green Council was commenced on 29th June. Orders had been placed for the plant required in connection with the supply of hot water from the Battersea power station to the Westminster City Council's Pimlico housing estate for heating purposes.

The Llanelly & District Electric Supply Co., Ltd., reports a balance at credit of profit and loss account for the year ended 31st December last of £176,335, which includes £8,182 brought in. To this is added £21,915, provision for income tax not now required, making £198,250. After providing £32,726 for income tax, £88,728 for depreciation, and placing £22,249 to general reserve, it is proposed to pay a final ordinary dividend of 4 per cent, again making 6 per cent. The balance carried forward is £10,379.

The Newcastle & District Electric Lighting Co., Ltd., reports a profit for the year ended 31st December last of £73,269, as compared with £86,077 for the previous year, which with interest received on investments, estimated additional present value of debtors for hire-purchase installations and £15,435 brought in, makes £99,662. After providing for income tax and debenture interest, and making other allocations, there is a balance of £39,003. The dividend for the year is maintained at 7 per cent, less tax, and £15,903 is carried forward.

The British Aluminium Co., Ltd., in a preliminary statement, shows a total profit for 1947 of £2,123,347, after provision for E.P.T., as compared with £1,368,095 for 1946, which with £308,361 brought in, makes £2,431,708. After making various provisions, there is a balance

of £547,203 (against £522,861). The ordinary dividend is maintained at 10 per cent, less tax, for the year by a final payment of 6 per cent and £332,703 is carried forward.

Switchgear & Cowans, Ltd., report a profit for the year ended 31st December last, after providing for depreciation, of £52,653, and after deducting directors' fees and taxation, there is a net profit of £22,703 (against £6,584) which with £22,252 brought in, makes £44,955 available. £2,000 is transferred to pension fund, and the dividend for the year is raised from 10 to 20 per cent, less tax. The balance carried forward is £29,755.

The West Gloucestershire Power Co., reports a balance from revenue account for 1947 of £115,534, as compared with £129,912 for 1946, and after deducting income tax and making allocations to general reserve, debenture sinking fund and pension fund, the net balance is £44,012 (against £46,550). The ordinary dividend for the year is unchanged at 6½ per cent, and £49,765 is carried forward (against £33,978 brought in).

The Lothians Electric Power Co., reports an increase in revenue from £326,634 to £362,249 for 1947. Expenses fell from £281,803 to £253,525. A final dividend of 4 per cent (same) again makes a total of 7 per cent for the year, leaving £135,632 (£46,543) to be carried forward.

The Richmond (Surrey) Electric Light & Power Co., Ltd., records gross revenue for 1947 amounting to £155,011 (against £153,950 in 1946) and net revenue of £31,204 (£31,711). The dividend is maintained at 6 per cent and £414 (£914) is carried forward.

The South Metropolitan Electric Light & Power Co., Ltd., reports gross revenue for 1947 totalling £1,348,707 (£1,363,618). The net revenue was £278,847 (£313,563). Depreciation took £117,494 (£124,920), taxes £50,000 (£80,000) and contingencies nil (£7,000). After again paying a dividend of 7 per cent, £73,032 (£69,186) is carried forward.

Cable & Wireless (Holding), Ltd.—Sir Edward Wilshaw, the governor, stated at the annual general meeting last Friday that he hoped that the arbitration tribunal to be held into the price to be paid by the Government for the shares in Cable & Wireless, Ltd. (the operating company) would sit before the Long Vacation commencing on 1st August. When the tribunal had fixed the sum to be paid interest would be received retrospective from 1st January, 1947.

The Metropolitan Electric Supply Co., Ltd., reports a gross revenue for 1947 of £3,629,899 and working expenses of £2,930,840, leaving a net revenue of £699,059, as compared with £828,683 for 1946; to which is added £216,370 brought in, interest and dividends on investments, provision for tax, no longer required, and balance of contingency account no longer required, making £1,751,725. After providing for debenture interest, etc., income tax and making various appropriations, it is proposed to pay a final ordinary dividend of 6 per cent, making 9 per cent for the year (unchanged). The balance carried forward is £333,113. Sales of electricity by the company and its subsidiaries during the year totalled 834·2 million kWh (against 819·7 million kWh) and the maximum supply demanded rose from 247,855 kW to 260,945 kW.

Enfield Rolling Mills, Ltd., reports a net profit for the year ended 31st December last of £635,023, as compared with £177,847 for the previous year. In 1946 £125,000 was charged for deferred repairs and considerable provision was made for E.P.T. The dividend for the year is unchanged at 5 per cent, and the bonus of 2½ per cent is also repeated. General reserve receives £197,374 (against nil) and £53,034 is carried forward (against £175,621 brought in).

The Midland Electric Manufacturing Co., Ltd., reports a trading profit for 1947 of £144,063, as compared with £121,046 for 1946, and a net profit of £53,160 (against £60,011). The dividend for the year is 20 per cent, plus a bonus of 15 per cent (both unchanged).

The Electric Supply Cpn., Ltd., is to pay a final dividend of 6½ per cent. (same), again making 10 per cent for the year.

The Renold & Coventry Chain Co., Ltd., is paying an interim dividend of 3 per cent (same) on account of the forty weeks ending 4th April on a larger capital.

The National Gas & Oil Engine Co., Ltd., is maintaining its dividend of 5 per cent. The net profit, after taxation, has increased from £37,128 to £67,267.

Electricity Companies' Securities

The Ministry of Fuel and Power last week published a notice giving the official compensation values of electricity securities. The list included altogether 129 securities of the C.E.B., London and Home Counties J.E.A. and forty-five companies. On the same day the British Electricity Authority issued a notice dealing with the vesting position of valued securities, unvalued securities and composite companies.

Liquidations

Correx Communications Equipment, Ltd.—Winding up voluntarily. Liquidator, Mr. D. Mahoney, 3 Great Winchester Street, London, E.C.2. Claims to the liquidator by 31st March.

Green Electrical Industries, Ltd.—Last day for receiving proofs 24th March. Liquidator, Mr. A. E. Attwood, 90, Queen Street, Cheapside, London, E.C.4.

Bankruptcies

A. A. Lumelino, lately trading as the Star Electrical Service, 6a, Cranley Mews, South Kensington, London, S.W.5, electrical contractors.—Receiving order made 3rd March, on a creditor's petition.

STOCKS AND SHARES

STOCK Exchange business is running on quiet lines, but in spite of the gloom of the White Paper and the bleakness of the outlook for 6th April, the Budget date, prices of stocks and shares are maintained somewhat surprisingly well. Home Electricity Supply ordinary and preference shares, now quoted ex dividend, are decidedly better on the week, allowing for the deductions. Equipment and manufacturing shares keep steady. British Transport 3 per cents, given in exchange for Home Railways stocks, have gone back, owing to the forthcoming competition of the Electricity issue.

Electric Supply Shares Ex-All

In accordance with the market arrangements announced a fortnight ago, electric supply issues due to be taken over on 1st April were duly quoted on 10th March ex-all interest and dividends due to be paid up to the end of this month. Bargains are now transacted free of transfer stamp, for settlement on the 6th April account day in the form of British Electricity stock. Official take-over prices have been published in the Press, and can be compared directly with market prices, uncomplicated now by allowances for dividends and stamp-charges. Throughout the list, the disparity has been adjusted to the common basis of a 2½ per cent discount on the compensation value for the shares. This is the same thing as a price of 97½ for British Electricity stock, assuming an issue price of 100. The discount on the debenture stocks is about 5s. per cent less.

British Electricity Stock

Terms of the new British Electricity stock are expected to be made known after business hours on the vesting day. The three unknowns are, of course, the rate of interest, the price, and the redemption-dates. So far as the first two are concerned, the market expects a 3 per cent issue at par. On that assumption, the life of the stock would, at the moment, have to be shorter than that of 3 per cent British Transport stock in order to satisfy the Act, which provides that the issue shall be in line with gilt-edged market conditions of the day. Transport stock has a currency of 30 to 40 years and is quoted at a discount of about 3 per cent. Among British Government 3 per cent issues, the Savings Bonds redeemable 1965-75 stand nearest to 100. Consequently, anticipation favours 20 to 30 years as the most likely redemption dates for the Electricity Stock

Changes on the Week

Allowing the dividend deductions, many electric supply and Central Electricity Board stocks are standing appreciably higher than they were a week ago. Electricity Supply Corporation ordinary, for instance, show a net gain of nearly 1s. 6d. to 49s. 6d., which brings the price within 1s. 2d. of the take-over figure. C.E.B. stocks have been raised on balance by 2 to 4 points. Electric equipment shares show few changes worthy of comment. General Electrics at 83s. 9d. and Ever Ready at 34s. 6d. are better. The engineering group is noticeably strong. Babcock & Wilcox gained 1s. 9d., at 68s. 3d., Decca 31s. 3d. and Cossor 15s. 6d. have put on $\frac{1}{16}$ and 6d. respectively.

Cable & Wireless

Cable & Wireless ordinary has been subject to sharp fluctuations, falling 12½ points to 170 before it rallied to 179, the latter price showing a fall of 3½ on the week. At the meeting last Friday, the chairman expressed a hope that the operating company's take-over price would be decided before 1st August next.

Thorn Electric

To illustrate the manner in which general conditions can affect a new issue, mention may be made of the recent offer by Thorn Electrical Industries, Ltd., of 5 per cent preference shares at 22s. The security is excellent, the sponsorship first rate; normally, the shares would probably have been subscribed soon after the opening of the subscription-lists. As it happened, however, the offer came on a day when the influence of the White Paper was paramount, with the result that, of the shares offered, the public took only 50 per cent. The under writers were left with the balance, and the price instead of commanding a small premium, is now at a discount of 3d.; that is, 21s. 9d. for the £1 shares. At this price the yield on the money is £4 12s. per cent.

Public Boards

A number of gilt-edged stocks are included under the provisions of the Electricity Bill, the majority being those of the Central Electricity Board. These are also to be taken over on 1st April, in company with the stocks and shares of the electricity supply companies concerned. Having regard to the large amount of capital involved—in the case of the Central Electricity Board there is some £60 million stock issued—it is of interest to compare the official figures with the prices at which the stocks can be sold in the market. Here are ten of the securities affected:—

Stock		Dated	To-day's Bid Price	Take-over Price
Central Electricity	5%	1950-1970	105½	108½
do.	5%	1955-1975	114	117½
do.	4½%	1957-1982	113½	116½
do.	4½%	1951-1973	105½	108½
do.	4%	1959-1989	110½	113½
do.	3½%	1963-1993	110	113
do.	3½%	1974-1994	109½	111½
London & Home Counties Joint Elec.	5%	1955-1975	115	118½
do.	4½%	1955-1975	111½	115
do.	3½%	1955-1975	103	105

The Future of E.D.A.

Speeches at Area Committee Luncheons

THE Eastern, Greater London and Southern Committees of the E.D.A. S.E. & E. Area recently held their annual meetings and luncheons.

The Eastern Committee met at Electric House, Great Yarmouth, where the luncheon was also held and which was attended by the representatives of a number of local authorities. Mr. C. T. Melling, in responding to a toast to the Eastern Electricity Board proposed by Mr. G. Christy, the vice-chairman of the Eastern Committee, stressed that the policy of the Board was that of giving service to consumers. Development in the ordinary sense could not proceed at present owing to generating plant shortage, but there was much to be done in getting people to use electricity with the utmost efficiency and economy.

In proposing the toast, Mr. Christy referred to the substantial achievements of the past. Some people believed that the past pride of local achievement must give place to apathy and stagnation. He hoped and believed that this would not be the case, and was glad that under the new era there would be consultative committees upon which a large proportion of members would be representatives of local councils, and through which the consumer's voice would be heard.

The toast of the Electrical Development Association and the Eastern Committee was proposed by the Mayor of Great Yarmouth, Ald. F. H. Stone, who is also the chairman of the Electricity Committee. After paying tribute to the work of the Association, he said that he was glad to know that it was to continue under the new regime.

Mr. Dale, general manager and secretary of the Association, in replying to the toast, said he had faith that the work done by the Association over the last twenty-eight years would go on. In a few years the position might be reached when the present state of restrictions would be reversed.

Greater London Committee

At the annual luncheon of the S.E. and E. Area, Greater London Committee, held at the Connaught Rooms and presided over by the chairman, Mr. J. R. Jones, Mr. H. J. Randall, immediate past chairman of the Council and the chairman of the London Electricity Board, congratulated the Committee on the year's activities and the excellent report. He was hoping that a Conference would be set up in the London Area and that contacts would continue.

Mr. N. Elliott, the chairman of the South Eastern Electricity Board emphasized the need there would be to maintain close contact with consumers. Good local service would be highly important. He felt the future would still necessitate E.D.A. Conferences.

Southern Committee

The Southern Committee of the E.D.A. S.E. and E. Area, presided over by the chairman, Mr. S. J. C. Ellis, held their annual meeting and luncheon at the Connaught Rooms, the principal guests being Mr. N. Elliott, chairman of the South Eastern Electricity Board, and Mr. H. Nimmo, chairman of the Southern Electricity Board. The general manager and secretary, Mr. V. W. Dale, spoke of the hope they had for the future and the close link there had always been with local authorities which it was hoped would continue.

Scottish Area

The annual luncheon of the Scottish Area of the British Electrical Development Association was held in Edinburgh on 12th March, Mr. H. I. Hulme, chairman of the Scottish Area Committee, presiding.

Sir Norman Duke, K.B.E., C.B., D.S.O., K.C., chairman South East Scotland Electricity Board, proposing the toast, "The British Electrical Development Association," said that for twenty-nine years the Association had helped to form a link between the electrical industry and the public. There was need, he said, for a national body which could look at the development aspect of electricity from the national point of view, and there need be no uncertainty about the future of E.D.A. Proposals for the amendment of the constitution of the E.D.A. Council had been made which would make it representative of the fourteen Area Boards, North of Scotland Hydro-Electric Board, and the North of Ireland Board.

Mr. V. W. Dale, general manager and secretary of E.D.A., said he hoped the B.E.A. would escape some of the criticisms which had been levelled against other nationalized industries.

Mr. J. S. Pickles, J.P., B.Sc., M.I.E.E., chairman, South West Scotland Electricity Board, proposed the toast of "The Guests" and Sir Patrick Laird, C.B., F.R.S.E., Secretary, Department of Agriculture for Scotland, replied.

Northern Counties Area

At the annual dinner of the Northern Counties Area at Newcastle-on-Tyne on 11th March, Mr. W. F. T. Pinkney said it was difficult to see how increases in electricity charges could be avoided when the industry was nationalized. Mr. H. H. Mullens (chairman of the branch) and chairman of the North East Electricity Board, stated that the existing committee of the Association would continue until 31st March, when they might know what the future held.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1943

BRITISH Thomson-Houston Co., Ltd., J. D. Cockcroft, P. E. Pollard, B. Newsam and G. S. C. Lucas.—" Radio-locating apparatus." 5123. 30th March, 1943. (598649.)

1944

English Electric Co., Ltd., and R. J. Welsh —" Power plant comprising a prime mover and an internal-combustion compressor supplying motive fluid thereto." 3904. 2nd March, 1944. (598892.)

Standard Telephones & Cables, Ltd.—" Telephone exchange systems." 7991. 7th June, 1943. (598893.) " Electron discharge devices." 18952. 7th May, 1943. (598898.)

British Thomson-Houston Co., Ltd.—" Closing control of electric switches." 13512. 14th July, 1943. (598894.)

R. Crittall & Co., Ltd., and J. L. Musgrave.—" Electric heating systems for buildings and structures." 17949. 20th September, 1944. (598897.)

Western Electric Co., Inc.—" Radio course marking apparatus." 21301. 5th April, 1940. (598900.)

Murphy Radio, Ltd., P. C. Cullen and C. C. Holmes.—" Variable coupling of oscillatory circuits." 23447. 24th November, 1944. (598662.)

1945

W. W. Triggs (Farnsworth Television & Radio Corporation).—" Unidirectional power supply." 1756. 22nd January, 1945. (598906.)

J. V. Dunworth.—" Radio receivers for radar echo signals." 16558. 28th June, 1945. (598672.)

E. Mittelmann.—" High-frequency electrical heating." 19514. 21st July, 1944. (598926.)

Standard Telephones & Cables, Ltd., and B. Secker.—" Electric measuring apparatus." 22993. 6th September, 1945. (Addition to 579530.) (598710.)

Marconi's Wireless Telegraph Co., Ltd.—" Attenuating circuits." 23074. 7th September, 1944. (598722.)

Westinghouse Brake & Signal Co. Ltd.—" Mounting arrangements for multi-pin plug-in devices such as relays." 23081. 9th September, 1944. (598725.)

British Thomson-Houston Co. Ltd.—" Electric safety switches in centrifugal machines." 23131. 11th September, 1944. (598739.)

" Inorganic sheet materials." 24440. 26th September, 1944. (598856.) " Polymers and copolymers of acenaphtylene." 24441. 26th September, 1944. (598857.)

Standard Telephones & Cables, Ltd.—" Electrical null-indicating instrument." 23146. 14th September, 1944. (598743.)

A. Reyrolle & Co., Ltd., T. Williams and E. E. Bramwell.—" Electric switchgear." 23166. 7th September, 1945. (598749.)

S. Jefferson.—" Frequency measurement of radio oscillations." 23172. 7th September, 1945. (598752.)

British Insulated Callender's Cables, Ltd., and R. W. Blades.—" Electric junction boxes." 23196. 8th September, 1945. (598761.)

A. F. Berry.—" Electric heating apparatus suitable for cooking and other purposes." 23268. 10th September, 1945. (598782.)

M-O Valve Co., Ltd., and G. W. Warren.—" Electron multipliers." 23282. 10th September, 1945. (598791.)

General Electric Co., Ltd., and L. C. Jesty.—" Optical projection of television pictures." 23283. 10th September, 1945. (598792.)

General Electric Co., Ltd., and G. W. Warren.—" Electron multipliers." 23284. 10th September, 1945. (598793.)

Record Electrical Co., Ltd., and E. J. Ainsworth.—" Control of electricity consuming units." 23291. 10th September, 1945. (598794.)

Patelhold Patentverwetungs & Elektro-Holding Akt.-Ges.—" Receivers incorporating super-regenerative amplifiers." 23384. 11th September, 1944. (598807.)

C. J. Cox.—" Electrical heating apparatus." 23420. 11th September, 1945. (598812.)

Chloride Electrical Storage Co., Ltd., R. Gray and H. C. Jones.—" Topping-up devices for electric accumulators." 23422. 11th September, 1945. (Cognate application 28926/45.) (598673.)

Chloride Electrical Storage Co., Ltd., and R. Gray.—" Means for facilitating the topping-up of electric accumulators." 23423. 11th September, 1945. (598674.)

British Insulated Callender's Cables, Ltd., United Insulator Co., Ltd., J. L. Miller and L. Macfarlane.—" Electric capacitors." 23479. 12th September, 1945. (598817.)

General Electric Co., Ltd., and W. J. D. Harrison.—" Electromagnetic relays." 24184/5. 19th September, 1945. (598675/6.)

Okonite-Callender Cable Co., Inc.—" Electric cable systems having means of locating electric faults therein." 24378. 21st September, 1944. (598936.)

Standard Telephones & Cables, Ltd., J. R. Pheazey and R. J. M. Andrews.—" Means for electrically connecting wires to terminals." 24381. 20th September, 1945. (598845.)

British Thermostat Co., Ltd., and J. E. Sherlock.—" Sealing devices for rotary shafts." 24392. 20th September, 1945. (598846.)

E. K. Cole, Ltd., and C. L. Burnard.—" Wave band indicators for radio receiving sets." 24424. 21st September, 1945. (598852.)

W. L. Stern.—" Automatic electric current limiters." 24425. 21st September, 1945. (598853.)

L. Grangette.—" Device for the automatic control of electric arc furnaces." 24994. 18th July, 1939. (598941.)

General Electric Co., Ltd., and W. J. D. Harrison.—" Airtight containers for electric devices." 25602. 2nd October, 1945. (598678.)

A. W. Kidd.—" Electrically driven mine haulage gear." 28820/1. 31st October, 1945. (598681/2.)

1946

British Thomson-Houston Co., Ltd., J. D. Cockcroft, P. E. Pollard, B. Newsam and G. S. C. Lucas.—" Measurement of time intervals." 20786. 30th March, 1943. (Divided out of 598649.) (598701.) " Phase-varying networks." 20787. 30th March, 1943. (Divided out of 598649.) (598702.)

Amended Specification

574392. F. Rimmington.—" Electric soldering irons."

Australian Notes

From a Correspondent

THE New South Wales Minister for Works and Local Government (Mr. Cahill) has approved the payment of £57,000 in subsidies to four country districts for electricity extensions.

Power Station Schemes.—The Premier of South Australia (Mr. Playford) states that a power station is to be erected at Port Augusta to enable nearly £20,000,000 worth of zinc to be recovered from the enormous slag dump at the Port Pirie smelters. Recovery is entirely dependent upon the provision of cheap power. Construction of the second section of the South Fremantle power station has been authorized by the Western Australian Cabinet. The cost is estimated at £2,354,000. It is expected that the first section of this power house will be in operation to augment the East Perth power house by the end of 1949.

Electrical Manufacture.—H. Fisher (Oldham), Ltd., which manufactures electric washing machines, electric drying cabinets, water heaters, immersion heaters, convection heaters, thermostats for water heaters, etc., has decided to establish a factory at Mowbray, Tasmania. It is expected that at the outset some 300 persons will be employed.

The Commonwealth Statistician reports that whereas Australian exports of metals and machinery (including electrical) in the financial year 1938–39 were valued at only £9,500,000, by the year 1946-47 they had jumped to £29,250,000.

Next Week's Events

Monday, 22nd March

BIRMINGHAM.—James Watt Institute, 6 p.m. I.E.E. South Midland Centre and Radio Group. " Closed Cycle Control Systems," by Prof. A. Tustin.

Grand Hotel. 6.15 p.m. Birmingham Electric Club. Annual meeting. " Further Points of Detail," by H. M. Fricke.

CARDIFF.—South Wales Institute of Engineers, 6 p.m. I.E.E. Western Installations Group. " Electrical Aspects of Overhead Travelling Cranes," by G. V. Sadler.

LIVERPOOL.—Philharmonic Hall, Hope Street, 6.30 p.m. I.E.E. Mersey and North Wales Centre. Faraday Lecture on " Electricity and Everyman," by Dr. P. Dunsheath.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. Informal discussion on " The Location of Underground Services," to be opened by J. W. Leach.

Charing Cross Hotel, 7.30 p.m. Institute of Welding (South London Branch). Annual dinner.

NEWCASTLE-ON-TYNE.—Neville Hall, 6.15 p.m. I.E.E. North-Eastern Centre. " Centralized Ripple Control on High-Voltage Networks," by T. W. Ross and R. M. A. Smith.

Tuesday, 23rd March

GLASGOW.—Royal Technical College, 6.30 p.m. I.E.E. Scottish Centre. " Commercial Development of Electricity Supply as a Consumer Service," by C. T. Melling.

COVENTRY.—Coventry Electric Club. "Street Lighting," by J. M. Waldram.

LEEDS.—Electricity Department, Whitehall Road, 6.30 p.m. I.E.E. North Midland Centre. Lecture summarizing papers read at convention on " Automatic Regulators and Servo Mechanisms," by Dr. J. C. Evans.

LUTON.—Technical College, Park Square, 7.30 p.m. Luton Electrical Society. Informal meeting. " Electro-Chemistry," by B. E. A. Vigers.

NOTTINGHAM.—Gas Department Lecture Theatre. I.E.E. East Midland Centre. " Protective Finishing of Electrical Equipment," by F. Widnall and R. Newbound.

Wednesday, March 24th

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. " Three-Dimensional Cathode-Ray Tube Displays," by E. Parker and P. R. Wallis.

MANCHESTER.—Great Hall, College of Technology, 7.30 p.m. I.E.E. North-Western Centre. Faraday Lecture by Dr. P. Dunsheath.

Thursday, 25th March

LONDON.—Connaught Rooms, W.C.2, 12.30 for 12.55 p.m. Batti-Wallahs' Society. Luncheon. Address by Lt. Gen. Sir Charles J. S. King.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Bath.—29th March. City Council. Electrical supplies for twelve months from 1st June next. (5th March.)

Bedfordshire.—27th March. Education Committee. Electrical installation in temporary accommodation, North Bedfordshire College of Further Education. (12th March.)

Brierley Hill.—1st April. Urban District Council. Electrically driven vertical treble ram pump at Kinver Street pumping station, Wordsley, Stourbridge. Surveyor, Hawbush House, Brierley Hill.

Cape Town.—24th March. Electricity Department. Electrically operated vehicle-actuated traffic control equipment, including cables. Particulars from the Export Promotion Department, Room 55, 35, Old Queen Street, London, S.W.1.

Egypt.—31st March. Egyptian Government. In connection with the invitation for the supply of mechanical and electrical equipment for the Aswan Dam hydro-electric scheme, the Government announces that offers of second-hand diesel generating sets of 250 kW each will be considered. (20th February.)

Gipping.—31st March. R.D.C. Electrically driven booster pump. Surveyor, Council Offices, Needham Market, Suffolk.

Hale.—24th March. Urban District Council. Four centrifugal pumps, with motors, switchgear, etc., for the Hale drainage scheme. G. B. Kershaw & Kaufman, 1, Victoria Street, Westminster, S.W.1.

Orders Placed

London.—County Council. Accepted. Electrical installation at the Peterborough School, Fulham.—Holliday & Son (Electrical), Ltd., Westminster.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—New chemistry department (£42,000), High Street, for the University authorities.

Alnwick.—Houses (34) on the Ravensmede estate; U.D.C. surveyor.

Boldon.—Alterations to central stores for the Boldon Industrial Co-operative Society; C.W.S. Architects' Department, 90 Westmorland Road, Newcastle-on-Tyne.

Canterbury.—Houses (32), Martyrs' Field and Spring Lane sites; L. H. Wilson, city architect, Municipal Buildings.

Castle Ward.—Airey houses (22) at Ponteland; R.D.C. surveyor, Council Offices, North Road, Ponteland.

Chester-le-Street.—Houses (30), South Pelaw estate, for the U.D.C.; direct labour.

Coatbridge (Lanarkshire).—New buildings at Whifflet foundry of R. B. Tennent, Ltd. (£50,000); manager.

Coventry.—Assembly hall and kitchens at King Henry VIII School; D. E. E. Gibson, city architect, 1a, Warwick Row.

Cumberland.—Factory, Frizington, for the West Cumberland Industrial Development Co., Ltd.; Sir Alexander Gibb and Partners, London, S.W.1.

East Wittering.—Junior and infants' school, for West Sussex C.C.; G. A. Culverwell, Ltd., builders, Millers Building, Hampshire Terrace, Portsmouth.

Edmonton. — New factory building for Hawkins & Tipson, Ltd., Mebro Works, Cuckoo Hall Lane; A. Foster, constructional engineer, Stevenage Road, East Ham, E.6.

Gateshead.—Alterations to blocks A, B and D at Bensham Hospital for the T.C.; chief architect, Municipal Buildings.

Hornsey.—Factory, Hampden Road, Muswell Hill; Harry Odone, Ltd., builders, 2, Denmark Place, Hornsey, N.8.

Houghton-le-Spring.—Factories on new trading estate; W. Norman, builder, West Lane, Chester-le-Street.

Ilford.—Flats (36), Budoch Drive; S. C. Grover, Ltd., builders, Grange Works, Clinton Road, E.7.

Houses (28), Cheriton Avenue; New Ideal Homesteads, Ltd., Station Approach, Sidcup.

Jarrow-on-Tyne.—Factory for Diamond Metal Pressing (£65,000); Middleton (Blackpool), Ltd., 4, Grange Road, Darlington.

Kesteven.—Teachers' training college, Stoke Rochford (£50,000); county architect, County Offices, Sleaford.

Kilsyth.—Secondary school; county clerk, County Offices, Viewforth, Stirling.

Kingston - on - Thames. — Flats (272) and cottages, Kingsnympton Hall site; G. Grey Wornum, architect, 39, Devonshire Street, W.1.

Lancaster.—Houses (120) on Hala housing site for T.C.; L. Lyons. city engineer, Town Hall.

Lincoln.—Permanent traditional houses (52), Newark Road, Boultham Moor; housing architect, Stamp End, Lincoln.

Liverpool.—Speke modern secondary school; city architect and surveyor, Blackburn Chambers, Dale Street, Kingsway.

London.—New premises, Fetter Lane and Norwich Street junction, for Noakes Bros., Ltd., engravers; John Videan, architect, 31, Holborn, London, E.C.

PADDINGTON.—Two blocks of flats, Bishops Bridge Road; Tecton, architects, 21, Sackville Street, W.1.

Luton.—Factory buildings and houses (24), Eaton Valley Road; Percival Aircraft, Ltd., The Airport, Luton.

County secondary school, Riddy Lane; F. Oliver, architect, Town Hall.

Houses (50), "Orlit" type; Nox, Ltd., builders, 55, New Bond Street, W.1.

Manchester.—Surgical department, Withington Hospital; flats (96), Baguley Hall area; and houses (140), Chapel Lane, Blackley. City architect, Town Hall.

North Riding.—Conversion of part of Wombleton aerodrome into temporary school, for the C.C.; J. Catchpole, county architect, County Hall, Northallerton.

Norwich.—Rebuilding factory, Chapel Fields, for J. Macintosh & Sons, Ltd. (£225,000); J. Youngs & Sons, Ltd., builders, 24, City Road.

House (78), Earlham West estate; city architect, Municipal Offices.

Rotherham.—Residential block to Newman School for E.C.; E. J. Manson, borough engineer, Municipal Buildings.

Workshop and social hall, Domine Road, for Rotherham Co-operative Society, Ltd., Main Street; the Secretary.

Extensions, Town Corn Mills, Canklow Road; Robinson Bros., Ltd.

Sheffield.—Additions to Soho works, Saxon Road and Broadfield Road; S. & J. Kitchen, Ltd., agricultural engineers.

Extensions to factory, Archer Road, Troutbeck Road and Keswick Road; F. Guylee & Sons, Ltd.

Extensions to markets, Castle Hill, and crematorium at Hutcliffe Wood for T.C.; W. George Davies, city architect.

South Shields.—New Horsley Hill county primary school; J. Wilkes, architect, King Street.

Houses for the T.C. Builders:—D. Glen, Jarrow (16); Carruthers & Son, South Shields (18); J. Woolgar, South Shields (eight); and G. Bailey, Ltd., South Shields (36 houses and six houses and shops).

New Redwell Lane Secondary School for the E.C.; J. H. Morton & Son, architects, Martins Bank Chambers, Fowler Street.

Stockport.—Houses and flats (56), Broomfield Drive; borough surveyor, Town Hall.

Stockton-on-Tees.—"Orlit" houses (34), Green Lane; borough architect, 124. High Street, Stockton.

Stoke-on-Trent.—B I.S.F. houses (50), Springfield, Trent Vale (£66,000); G. Wimpey & Co., Ltd., builders, Tilehouse Lane, Uxbridge.

Stone.—Junior school at The Radfords (£26,000); Rev. Fr. T. Cronin, P.P., St. Dominic's.

Stowmarket.—New nurses' home, Stow Lodge P.A. Institution, for East Suffolk C.C.; county architect, Ipswich.

Torquay.—Houses (100), Combe Pafford; borough surveyor, Town Hall.

Wallasey—Extensions to Highfield maternity home and erection of new nurses' home; borough surveyor, Town Hall.

Wallsend.—Houses (98) at Willington West Farm; borough engineer, Town Hall.

Houses and flats (46) for the T.C. in Churchill Street and Archer Street; J. H. James. builder, Archer Street.

Houses (30) on the St. Peter's Road estate for the T.C.; R. A. Gofton & Sons, builders, Front Street, Monkseaton.

West Riding.—County college, Tadcaster area; county architect, Wakefield.

Wirksworth.—Factory at Alton estate; Cooper & Roe, Ltd., hosiery manufacturers, Eagle Works, Carlton Road, Nottingham.

Mechanical Handling

Progress of Exhibition Plans

OVER 120 firms and organizations have booked space at the Mechanical Handling Exhibition (National Hall, Olympia, 12th-21st July) which is being organized by *Mechanical Handling*. Every conceivable type of conveyor, elevator, electric and petrol industrial truck, hand truck and coal-handling plant will be displayed. Several interesting mechanical handling layouts in the form of models will also be shown.

Concurrent with the exhibition a convention will be held and papers will be presented by authorities on various aspects of mechanical handling. One paper on the subject of "Coal, Coke and Ash Handling at Power Stations," presented by Mr. F. G. Mitchell, will deal with site conditions and requirements, how to handle rail-borne and water-borne coal, various types of conveyors, storage conditions and plants, safety devices and avoidance of accidents, dust nuisance, feeders and bunkers, automatic control and ash disposal plants.

A two-hour film covering every field of handling in the industry will be shown on the opening day and on Saturday, 17th July. On other days sections of the film will be shown linking up with the papers given at the convention.